The Electrical Industry's Weekly Magazine

December 3, 1956

Electrical World

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Street Lighting Can Pay Its Way

. . . page 16

McAfee Explains $35,000 Fee for Legislative Agent

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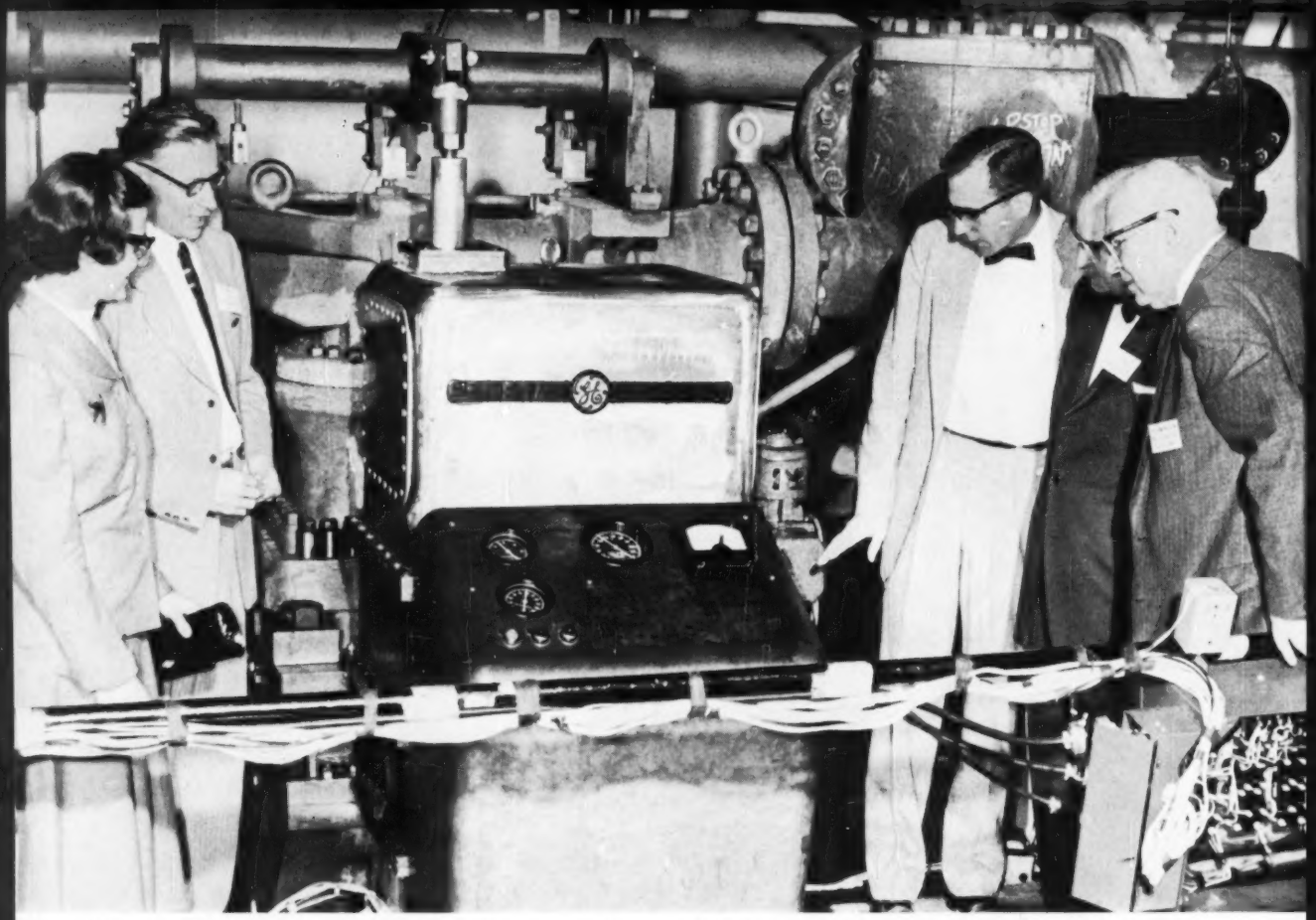
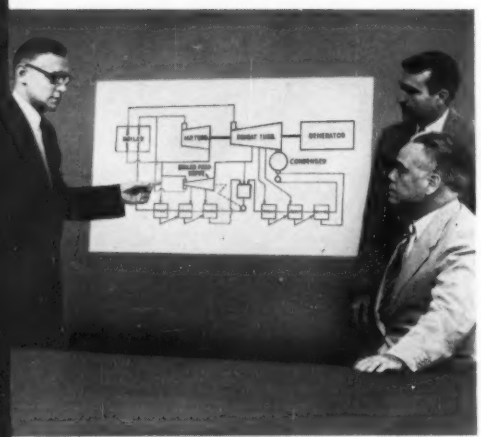


New General Electric turbine for boiler feed pump drive will be installed at the Appalachian Electric Power's Glen Lyn plant on the American Gas & Electric system. Main turbine is rated at 225,000 kw at 2000 psi, 1,050F/ 1,050F. Above, editorial personnel from utility industry publications witness testing of the first of several turbine drives for boiler feed pumps at General Electric's Small Steam Turbine Department's Fitchburg, Mass. plant.

Larger units and higher auxiliary power demands spotlight turbine drives for boiler feed pumps



DISCUSSING NEW TURBINE DRIVE for boiler feed pump applications are G. B. Warren (seated) V. P. and Gen. Mgr., G.E.'s Turbine Division, C. B. Seelig, Mgr. Mktg., (left) and S. Neal, Mgr.—Design Eng., of General Electric's Small Steam Turbine Department.

With system growth requiring more economical, larger generating units, and orders already placed for machines up to 450,000 kw having steam conditions of 3500 psig, electric utility men are focusing new attention on the use of turbines for boiler feed pumps. According to a recent study by General Electric's Small Steam Turbine Department, as well as independent studies by several utilities, significant economies result when turbine-driven pumps are used with high-pressure turbines of 200,000 kw and up.

From a system design standpoint, turbine drives for boiler feed pumps offer several advantages in that they draw less on the auxiliary power system. Result: electrical auxiliary power system requirements can be reduced, permitting lower transformer and circuit breaker ratings, and more kilowatts can be released as salable power. High-speed pumps—up to 8000 rpm—can be driven directly by turbines with the inherent advantage of variable speed.

Detailed information on the type of application where General Electric turbines for boiler feed pump drives can help you increase station output and profits may be obtained by contacting your G-E Apparatus Sales Office. General Electric Company, Section 301-333, Schenectady 5, New York.

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Electrical World

Published for 82 years for those engaged in the business of generating, transmitting, distributing, or supplying electric power

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COMING NEXT WEEK—Supercritical steam is growing in importance in the industry. Already 1.9 million kw of such units have been ordered. Next week EW will devote 24 pages to this development.

Even without a "Lightning-Vac", there's a way to handle outages

As a convenience for distribution superintendents, we advocate development of a "lightning-vac," an electronic device for predicting at which pole or poles (if any) lightning will strike during a storm.

Then a line crew could be standing by at a safe distance. As soon as lightning struck, damage could be repaired, limiting the outage to a few minutes.

Now let's take tongue out of cheek. What is the best available way to protect rural lines against lightning?

We say it's with O-B insulators. Their ability to withstand lightning has been proved time and again in the field and in the laboratory. We've turned the impulse generator loose on O-B pintypes, for example, and they've withstood man-made lightning that has twice the rate of voltage rise of natural lightning.

Your local Graybar man can provide additional proof of the lightning immunity of O-B insulators. While we're waiting for the lightning-vac, you can reduce lightning outages by insulating with O-B.

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Forthright Action in a Difficult Situation

J. Wesley McAfee, president of Union Electric Co, has taken courageous and forthright action in dealing with the lobbying charges leveled at his company. His course displays a keen appreciation of his responsibility to the public as well as to his employees and to the company's shareholders.

The full-text of McAfee's statement to the board of directors, which begins on page 15 indicates he has personally directed a full-scale investigation of his associates' role in urging passage of a bill in the Illinois legislature. Where there appeared to be deviation from company policy, he disciplined the responsible person. And he has set up procedures designed to prevent the recurrence of the actions which are under fire.

But McAfee has gone much further than this. He has admitted that possibly some mistakes were made, and he has made every reasonable effort to inform fully the public on every aspect of the affair.

To do this, the company ran in local papers two-page advertisements carrying the full text of McAfee's statement to the board. It released the statement to all newspapers as soon as it was made to the board. McAfee and his associates have granted a number of interviews to news reporters to clarify further the company's action. Also copies of McAfee's statement were immediately mailed to all stockholders.

The immediate result is that the newspapers in the Union Electric area have been carrying stories which give full explanations of the company's viewpoint and the company's actions. The air of mystery and the usual inferences and speculation are missing from most articles because the full facts are available. The few editorials written about the lobbying charge take note of McAfee's forthrightness.

In an editorial commenting on the situation, the St. Louis Globe-Democrat concluded:

". . . Mr McAfee has reached a high level of business statesmanship by his forthrightness. He has admitted the errors of his company and has invited a complete and public investigation. We do not see how he can do more.

"Since its reorganization the Union Electric Co has been a good citizen of St. Louis. The Globe-Democrat believes, with the facts thus far in our possession, that the company, having openly admitted the failure of one of its agents and having taken steps to make it impossible in the future, has acted in the public interest."

Studies of Nuclear Economics Must Continue

Are economic studies of nuclear power plants a waste of time today? Many industry experts feel that they are. But as we see it, studies of the economics of nuclear power can contribute importantly to the progress of nuclear technology. They help to put the various problems of this new art in proper perspective.

Those who think that economic studies are a waste at this stage of development point out that there are too many assumptions, that reactor life is only a guess, and that the nuclear energy industry is too young to have had any measure of equipment life. So how can the proper charge for reactor depreciation be determined?

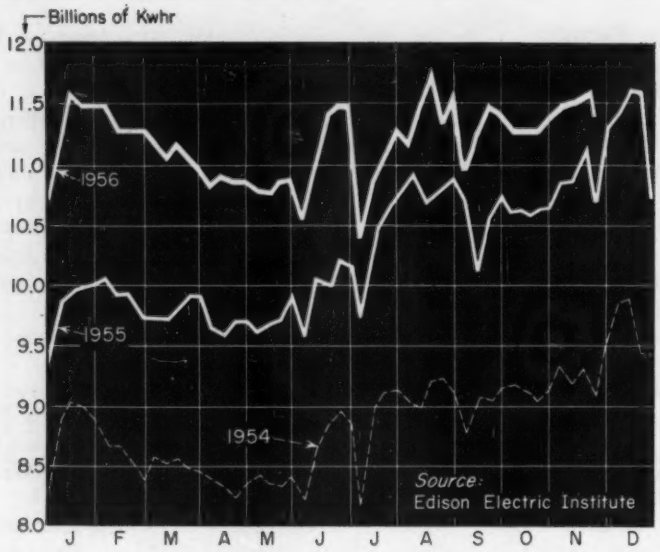
Insurance is another component of investment that is cited as in doubt. No insurance company has yet announced any premium charges for atomic insurance. Government will undoubtedly underwrite coverage of any major nuclear accident, and this will have a major effect upon insurance carrying charges.

Estimates of fuel charges still are in an area of uncertainty. For we are only now starting to fabricate fuel elements for large power reactors and have not yet reprocessed any elements.

It might appear difficult to rally a defense for economic studies of nuclear power projects against such arguments. But the fact remains that economic studies have furnished valuable information in the past and can still provide significant information for the future if they concentrate on unexplored aspects of nuclear reactors.

Today we can add little that is new by further economic analysis of reactors already proposed. Our estimates of reactor life, operating, maintenance, and construction costs have changed very little in the last six months or a year. But three years ago these estimates and these assumptions were good enough to prove one important thing . . . that nuclear power would some day be competitive with fossil fuel generation. This conclusion was important. It was entirely possible that studies might have concluded otherwise.

It seems to us that economic studies of new projects have great value in keeping nuclear power in proper prospective. They also help decide where most of our efforts should be concentrated. This makes sense not only in the face of a political climate that is fostering a crash program but also because it is good economics to find where we can get the most gain for the least expenditure of time and money.



OUTPUT

Week ended Nov. 24, 11,439,000,000 Kwhr Up 6.6%

Atomic Energy Commission requirements—1,125,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 6.9%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Nov. 24	+6.6	+6.9	+4.7	+5.5	+8.7	+7.0	+11.8	+7.1	+5.2	+8.0
Nov. 17	+3.9	+3.6	+3.8	+3.6	+4.0	+5.7	+7.2	+3.7	−3.7	+4.6
Nov. 10	+5.9	+9.6	+4.0	+4.0	+7.3	+4.8	+12.4	+8.2	+9.5	+6.9

Seasonally Adjusted Index 217.9 Week Ago 219.0 Year Ago 211.0

Here are the issue's highlights . . . Long range Pacific Northwest power picture looks better . . . Georgia Power Co gets J. J. McDonough as its new "head coach" . . . Two engineering councils plan to sponsor a two-year, $1-million survey into the life, habits, and supply of engineering manpower, and deficiencies of engineering professions . . . TVA's impact on the national election was mild —even in Tennessee . . . McAfee explains Union Electric Co fee paid to legislative agent . . . Deficits of $12.31 a lamp for street lighting can be wiped out . . . Underground residential service cost can be cut to about twice that of overhead.

Strike of 260 employees at Commonwealth Edison's 565,000-kw State Line Station near Hammond, Ind., forced supervisory employees to take over plant operation. Police chased pickets who attempted to prevent entry of coal cars into station yard. Plant is organized by United Mine Workers District 50. Contract between union and company expired last spring, but company had no explanation for the immediate cause of the walkout.

Preformed Line Products Corp accuses Fanner Mfg Co of patent infringement in suit filed in U. S. District Court in Cleveland. Action was brought in connection with manufacture and sale of guy grips and helically-preformed elements on stranded line.

Pennsylvania Power & Light is ordered to refund $6.3 million to customers by the state's Public Utility Commission. Rebate covers excessive charges and interest for 2½-year period ended Feb. 28, 1955.

SEC will start hearings Feb. 4 on the common stock holdings of sponsors in multi-sponsored Electric Energy, Inc, and Ohio Valley Electric Corp to determine compliance with Public Utility Holding Company Act.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Washington Wire . . . Controversy is shaping up on Bureau of Reclamation's proposal for high Pleasant Valley dam on the Snake River below Hells Canyon site. If adopted the plan would nullify Pacific Northwest Power's pending application for licenses for two low dams on the Snake at Mountain Sheep and Pleasant Valley sites. It would also flood out the Hell's Canyon site of Idaho Power's third low dam. It's up to Interior Secretary Fred Seaton to indicate whether the Reclamation proposal will gain Administration indorsement . . . FPC grants conditional stay of its order directing South Carolina Generating Co to decrease its rates to Georgia Power—pending decision on application for rehearing. FPC decision expected momentarily on whether it has authority to hear New York State Power Authority's application for Niagara Power development.

Recent survey of employee injury in the industry shows frequency rate of 5.24 for first nine months of 1956, compared with 6.02 for same 1955 period; and severity rate of 964 as against 1171 in 1955. Survey, revealed at EEI's 62nd Accident Prevention Committee meet, shows 122 fatal accident's for 1955 (including 95 electric shock or burn); 120 in 1954 (with 75 shock or burn).

About 120,000 Westinghouse employees will receive 1¢ per hour automatic wage hike or equivalent of about ½ of 1% in salary as cost-of-living adjustment under labor contracts. Total payroll increase is $2.5 million.

Consolidated Edison has awarded $1.3-million contract to Ingersoll Rand for main steam condenser and circulating water pumps for its nuclear power plant at Indian Point, New York.

Americans should not be complacent about the need for developing electric power installations using nuclear fuel, warns C. Rogers McCullough, deputy director of AEC. He suggested to delegates at recent annual ASME meet that nuclear power might permit us to save our hydrocarbon resources for chemical needs.

EEI's Committee on International Matters traveled to Mexico City last week to help plan formation of an Inter-American Council of Electric Associations. Group is headed by B. L. England, president, Atlantic City Electric.

ABOUT PEOPLE IN THE INDUSTRY

Most European nations critically need vast amounts of electricity, reported **James F. Davenport** upon his return from Switzerland. The Southern California Edison Co executive vice president said the U. S. averaged a 3,455-kwhr usage for every man, woman, and child during 1955, in contrast with 758 kwhr for Russia. But no satisfactory plan for power-hungry countries has been worked out yet, he said.

Power reactor operating costs are in an area "about which probably less is known and more has been said today than on almost any other subject," said **Kenneth Kasschau,** manager of nuclear engineering for ALCO Products, Inc, in a speech delivered in Brussels at the Power Reactor Conference for Belgium. He said nuclear capital construction costs may approach those for conventional stations some day, however.

More News About People page 32

BPA Sees Better Northwest Outlook

Large increase in federal and non-federal projects, proposed or underway, will supply for long range needs; short term power is clouded

A brighter long range picture of the Pacific Northwest power supply has been forecast by Bonneville Power Administrator William A. Pearl. He noted, however, that the shorter term outlook was clouded.

Citing results from BPA's annual forecast, Pearl predicted that with the aid of a large increase in proposed non-federal generation the area would have sufficient power to meet all firm and interruptible loads through 1965 under median water conditions, despite the heavy increases in loads forecast for the Northwest pool region.

He said this sharp upward revision is viewed by BPA as injecting within one year a sixfold increase into future energy supply and delaying anticipated deficits in energy by as much as three years.

Gains Credited to Cooperation

"Cooperation of Pacific Northwest utilities and the federal government in moving to meet the region's power needs has already rolled back anticipated 1961-62 power deficits three years to 1964-65, under critical water conditions," he declared.

The forecast noted that non-federal generation increments scheduled a year ago called for only 252,000 kw of the increase of 1,392,000 kw in regional prime power through 1965. But Pearl disclosed that prime new capability now scheduled or licensed by non-federal utilities represents 1,457,000 kw of the total 2,429,000 of the increased average kilowatts for all plants.

Shortage for '65 Seen Unlikely

While the forecast listed heavy increases in loads for residential, commercial, and industrial classes of users, Pearl said the large number of possible projects under study should result in enough new energy being brought onto pool lines to prevent any shortage in 1964-65.

Construction underway on federal projects will provide 2,299,250 kw of new capacity by December, 1961, and other utilities have 4,147,400 kw under construction or licensed before 1965, noted the report. Together with 8,381,730 kw of capacity on June 30, 1956, plus one 64,000-kw unit installed later, scheduled capability is placed at 14,892,380 kw.

The report revealed that there are seven federal plants now under construction: McNary, Chief Joseph, The Dalles, Roza, Cougar, Hills Creek, and Ice Harbor. An additional 18 projects are underway or licensed to non-federal utilities, of which seven represent 74% of the scheduled installations: Rocky Reach, Priest Rapids, Wanapum, Noxon Rapids, Brownlee, Oxbow, and Hells Canyon.

Pearl added that 43 projects, not including federal proposals, are under active consideration and would have an installation of approximately 5,500,000 kw.

"Possibility of a power deficiency in event of critical water conditions some eight years hence should not be a cause for alarm," commented Pearl. "The many additional hydro projects enumerated in the report where license applications are pending or investigations in process should provide the power when needed."

Role of Nuclear Plants Predicted

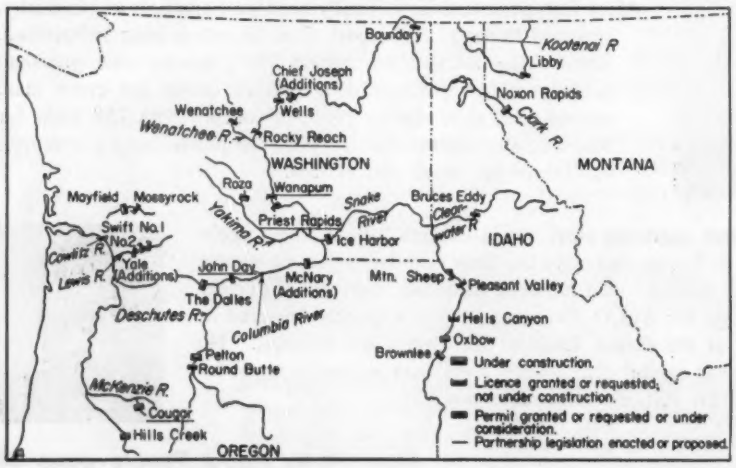
After economical hydro resources have been utilized, predicted Pearl, "the region will turn to conventional steam plants and later nuclear plants. . . ." Referring to the latter, he said that while full-scale tests are forthcoming, "nuclear plants of a size and cost to compete with the hydroelectric plants under active consideration must probably await another decade or more of engineering development."

The forecast noted that the federal Columbia system capacity was 47% of the western group system in 1945, that it rose to 64% during 1955-56, and in 1958 will climb to 68%. But with the large non-federal projects now underway this federal share will be 55% by 1964.

Contract negotiations to wheel power from non-federal projects—including Priest Rapids, Mossyrock, and Pelton—were reported progressing with purchasers. Most of the power from these projects will be transmitted over the federal system to load centers in the western group utilities of the Northwest pool.

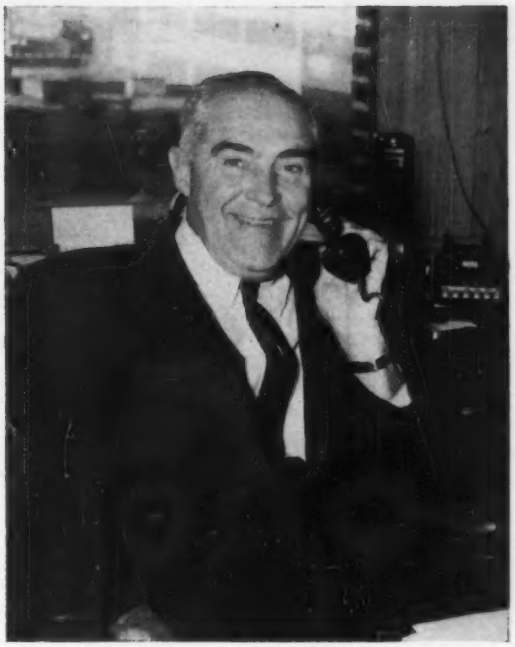
Turning to the less favorable conditions predicted for the next few years, Pearl said loads this year have exceeded forecasts and that resources are lower because of delays in placing Chief Joseph Dam units in service due to a prolonged supplier strike which affected equipment deliveries.

THREE major projects and others will boost area's power supply in next 10 years



J. J. McDonough: New "Head Coach" for Georgia Power

In the lean '20s, he preferred eating to engineering; took high school gridiron coaching job. Later grabbed ball for Georgia Southern and now has scored touchdown



John J. McDonough, who succeeds Harllee Branch, Jr, on Jan. 1 as president of Georgia Power Co, has seen the employment value of graduate engineers come full circle since he left Georgia Tech with a mechanical engineering degree in 1923.

"In those days, you could make more money doing almost anything else but being an engineer. In my own case, since I was more interested in eating than engineering, it was coaching high school football. And that's what I did for four years before ever getting into the power business."

He Studies As He Plays

Despite his engineering degree and natural interests in engineering work, McDonough found that, after playing varsity football for Tech with one hand while working for his degree with the other, a post as high school football coach in his hometown of Savannah was much more preferable financially than the business world. His engineering background did stand him in good stead in one sense during his academic career, however—it enabled him to fill out his secondary role as high school algebra teacher.

During these years, however, he made and maintained contacts with friends in the utility field and in 1927, during a casual visit to Atlanta, was offered the job of assistant to the manager of the Georgia Southern Power Co in Dublin—midway between Atlanta and Savannah. Georgia Southern, a forerunner of Georgia Power Co, in 1927 consisted of a group of municipal power companies, creaking along on the foundation of small diesel and steam generating plants.

What the Manager Shunned

"The job practically came along by accident," he says, "and it consisted of doing just about anything that the manager didn't want to do. And sometimes, with the type of equipment we had to keep running, it could involve some pretty basic mechanics."

For ten years, until 1937, he pretty well covered eastern Georgia, filling various managerial posts with what by then was the Georgia Power Co in five different cities. At very few times during this period did he have to call on his technical background as much as upon his administrative talents.

In 1937 he was promoted from commercial manager of Georgia Power in Atlanta to vice president and manager of the company's Rome Division. Three years later he was returned to Atlanta as vice president and division manager, and a year later elected executive vice president of the system.

He was the first person to hold this newly created position and, as in his first job 23 years before, his main duties have consisted of acting as head of the company in the president's absence and generally doing "what the boss didn't want to do."

He never quite got away from his early educational experiences, and probably the extra curricular post he values most at the present is the vice chairmanship of the Georgia University system's 15-man Board of Regents. This body exercises final policy-making authority over all of the state's institutions of higher learning.

McDonough is also a past president and director of the Georgia State Chamber of Commerce, and has been active in promoting the industrial growth of the state.

No Drastic Policy Changes

He and his wife, Meta Elizabeth, have two sons, Jack, a graduate of the University of Virginia and now in the brokerage field in Atlanta, and Bill, presently a senior at Vanderbilt.

McDonough doesn't envision any sudden or drastic policy changes in the operation of Georgia Power Co coinciding with his inauguration as president. His former boss and co-worker, Harllee Branch, Jr, has stepped into the presidency of the Southern Co, Georgia Power's parent, and the two will, as in the past, continue to work together closely.

Councils Back Engineer Survey

Two-year, $1 million project would gather data on all important aspects of the engineering profession

Comprehensive survey covering every important phase of the engineering profession is being initiated under sponsorship of two national joint councils—Engineers' Council for Professional Development and Engineers' Joint Council.

EJC recently endorsed the proposed survey and is prepared to appoint an operating committee to help direct the task which will cost an estimated $1 million. ECPD will meet in early December to give the idea a final endorsement and provide for representatives on the operating committee.

As presently proposed, the survey will gather all possible factual data in these fields bearing on the engineering profession:

- Professional services and responsibilities.
- The supply of brain-power.
- The individual engineer.
- Sub-professional engineering services.
- Engineering education.
- Registration and unionization.
- Organization of the profession.

From the data developed, the group charged with conducting the survey will be asked to interpret the results and to furnish full recommendations as to how deficiencies may be overcome, how engineers and engineering societies may become more effective in fulfilling their responsibilities, and generally what professional policies and goals are to be pursued.

Long-Range Benefits Predicted

The eleven-man task force assigned to presenting proposals for the survey believes the results will be of long-range use in many phases of industrial and government activities. The members further see the survey as a direct aid to individual engineers and their associations.

Commenting on the value of such a survey, the task force wrote:

"To measure up to the tasks required of it, the (engineering) profession must be assured that it is properly training, utilizing, rewarding, and attracting men of the highest competence and potentialities. No responsible person can honestly say that all is well in these areas today. Only a top-to-bottom survey can determine the nature of the mission, the extent to which it is being fulfilled, and the steps necessary to maximize our efforts in the most effective manner."

The directing or operating committee is to be established under the joint auspices of ECPD and EJC. It is suggested that the calibre and distinction of this group should be of a level to arouse enthusiasm and support in areas outside as well as within the profession.

Main duties would be to:

- Outline a form of organization to conduct the survey, using the task force proposal and supplementary suggestions from constitutent societies as a basis.
- Appoint a director and small staff to assist in detailing the program and later administering it under the committee's auspices.
- Make progress reports to the executive committee of ECPD and the board of directors of EJC, so that constituent societies may be continuously informed through their representatives.

Similar surveys have recently been made of the architectural and legal professions. While not all of the techniques and methods will be directly applicable to the engineering survey, it is expected that the results will furnish a sort of professional and individual portrait as comprehensive as the two previous studies. The engineering task force recommended that the study be patterned after the Hoover Commission's studies of government organization.

TVA: Mild Impact on Election

Did the Tennessee Valley Authority figure into presidential and congressional races in Tennessee and Kentucky—both of which went Republican this year? How did the people react to TVA issues? What promises were made to the people by both political parties? What's the outlook for TVA in the next four years?

EW sought answers to those questions through its correspondents and learned:

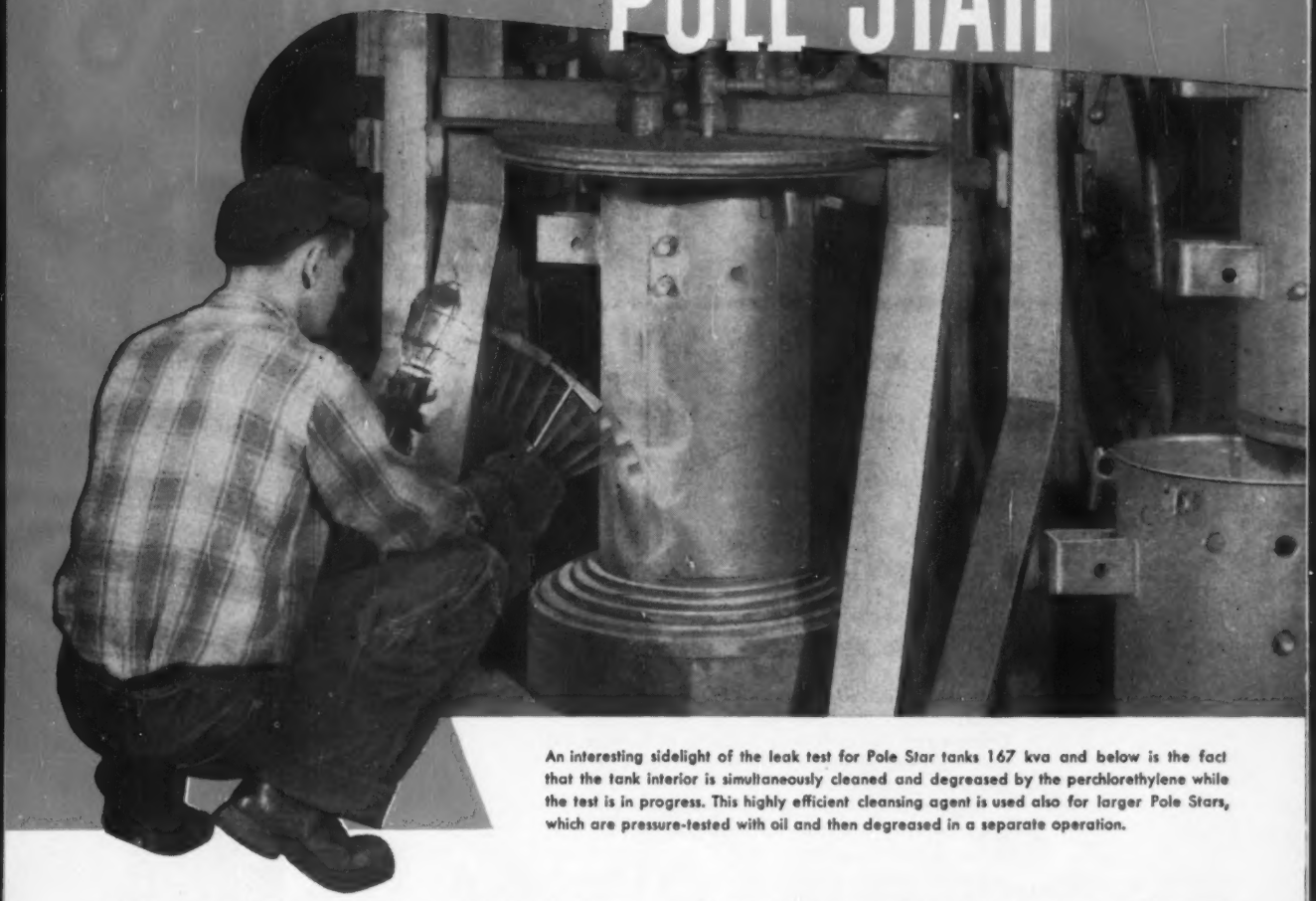
- That, in Kentucky, TVA was not an issue at all.
- That, in Tennessee, Democrats won by the usual pluralities in districts where TVA was a major issue (Middle Tennessee).
- That Vice President Richard Nixon promised in a Nashville speech that TVA's integrity would be maintained.
- That Kentucky's candidates for the Senate endorsed TVA development—including Republicans John Sherman Cooper and Thurston Morton who won.
- That TVA Chairman Brig Gen Herbert Vogel no longer attempts to hide the breach of policy between himself and the other two board members who are leftovers from the 20-year run of Democratic Administrations.

In Kentucky, the victories of President Eisenhower and the two Republican Senatorial candidates are attributed to Ike's personal popularity and a split in the Democratic party. Democratic Senatorial candidates Earle C. Clements and Lawrence W. Wetherby charged in campaign speeches that the Republican Administration had attempted to "sabotage" TVA. But apparently the charge did not take hold.

In Tennessee, political observers believe the state went Republican this year because of the Negro vote and the States Rights vote. Although the Negro vote was the overwhelming determinant, the States Rights vote in Shelby County alone could have swung the state to Stevenson. Presumably the Negro vote went to Ike because of his Administration's move toward integration. States Rightists apparently voted against both Democrats and Republicans as a protest against integration.

In four districts covered by the editorially Democratic Nashville "Tennesseean" and the editorially Republican Nashville "Banner," voters gave Democrats substantial pluralities. It thus appeared that, informed of what TVA faces, people voted against present policy.

He's hammering all welds—under pressure—to leak-proof your POLE STAR tanks



An interesting sidelight of the leak test for Pole Star tanks 167 kva and below is the fact that the tank interior is simultaneously cleaned and degreased by the perchlorethylene while the test is in progress. This highly efficient cleansing agent is used also for larger Pole Stars, which are pressure-tested with oil and then degreased in a separate operation.

In this age of elaborate testing devices, the "hammer" leak-detection test for Pole Star tanks seems almost primitive in its simplicity. Actually, it is a highly effective production-line procedure that has definite advantages over other methods of leak detection.

After all welds have been dusted with blue chalk, the tank is filled with perchlorethylene to a hydraulic pressure of 15 psi . . . then, all welded seams and joints are rapped sharply with a hammer while the workman, using a portable light to eliminate shadows, inspects the chalk areas for easily detected dark spots, which indicate leakage.

Vibrations set up by the hammer, as well as the force of the blows themselves, cause minute separations at any burned or insufficiently welded areas that might go unnoticed in tests using only internal pressure. Because of the low surface tension of perchlorethylene (it has a greater tendency to "spread" than do most liquids, including water), the liquid penetrates even microscopic openings.

When a leak is detected, the tank is returned to the welding department. After the faulty weld has been corrected, the tank must undergo complete re-inspection for possible leaks before finally being given the Pole Star stamp of approval.

167 Production Controls make Pole Star Best!

3 through 500 kva, through 67,000 volts

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division **CANONSBURG, PA.** Greater Pittsburgh District

pt POLE STAR

BIG...
but built for easy installation

Unique field assembly and welding methods developed by Allis-Chalmers cut installation costs for Detroit Edison

Pull-up blocks and dowel blocks, shown above, are used to simplify alignment during installation.

Size alone dictated that this huge 115,000-square-foot condenser for The Detroit Edison Company's River Rouge Station be fabricated and shipped in sections. Here's the way this job was handled:

Before shipment, matching joints were machine scarfed for full penetration welds, and sections were carefully fitted together. Each joint was then equipped with "dowel blocks" and "pull-up blocks" as shown in the inset.

The condenser was then disassembled and shipped.

Joint Seal-Welds Eliminated

In final assembly, dowel blocks were lined up . . . pull-up blocks quickly brought sections back to original shop position, snugly, and units were welded. This minimized erection costs. Welding sections together, eliminating the necessity of seal-welds with bolted flange sections, provided a vacuum tight, maintenance-free joint.

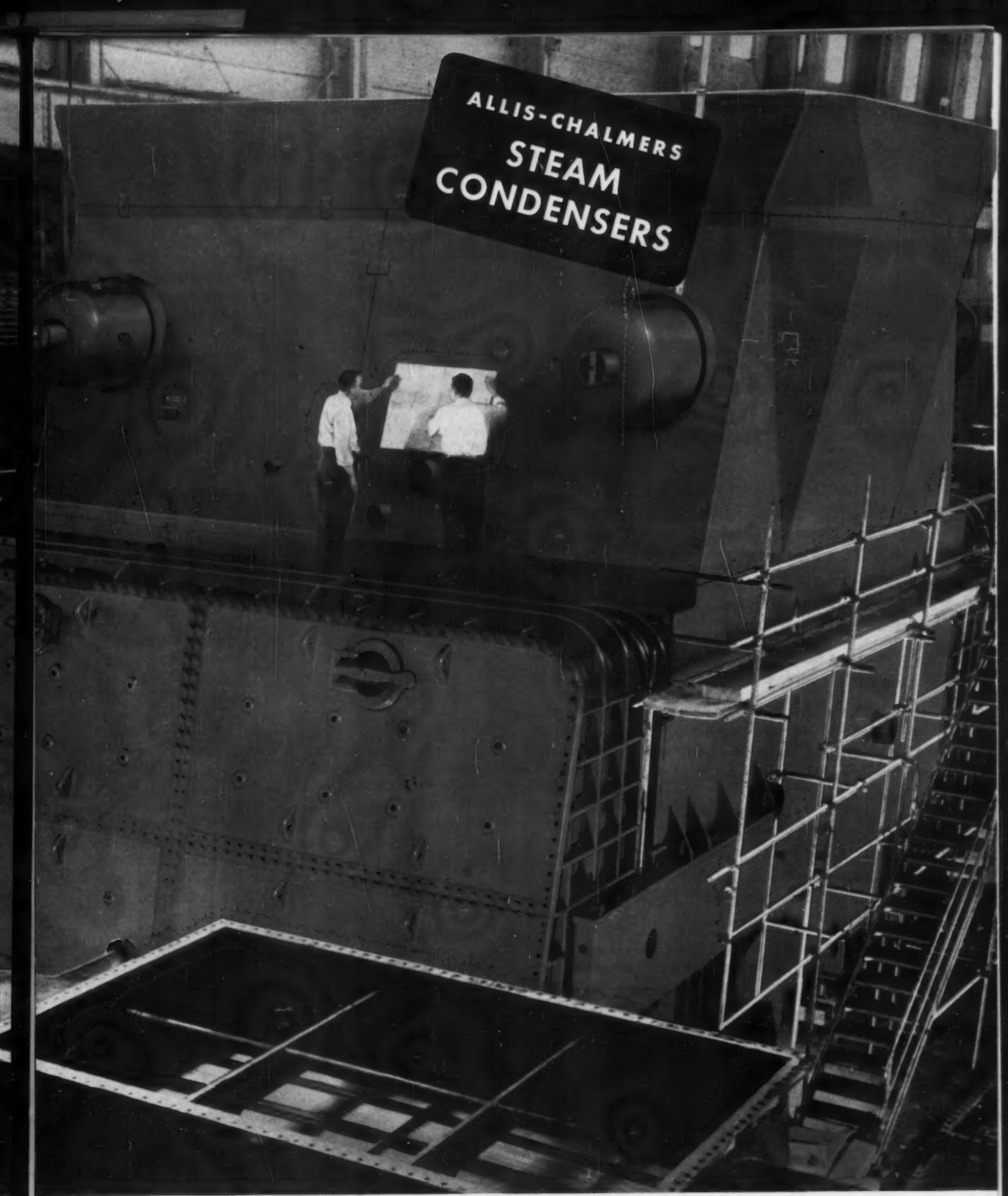
This is typical of the design and engineering extras that you get when you specify Allis-Chalmers condensers.

Get information. Call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Giant 115,000-square-foot condenser of new River Rouge Station.

A-C ALLIS-CHALMERS

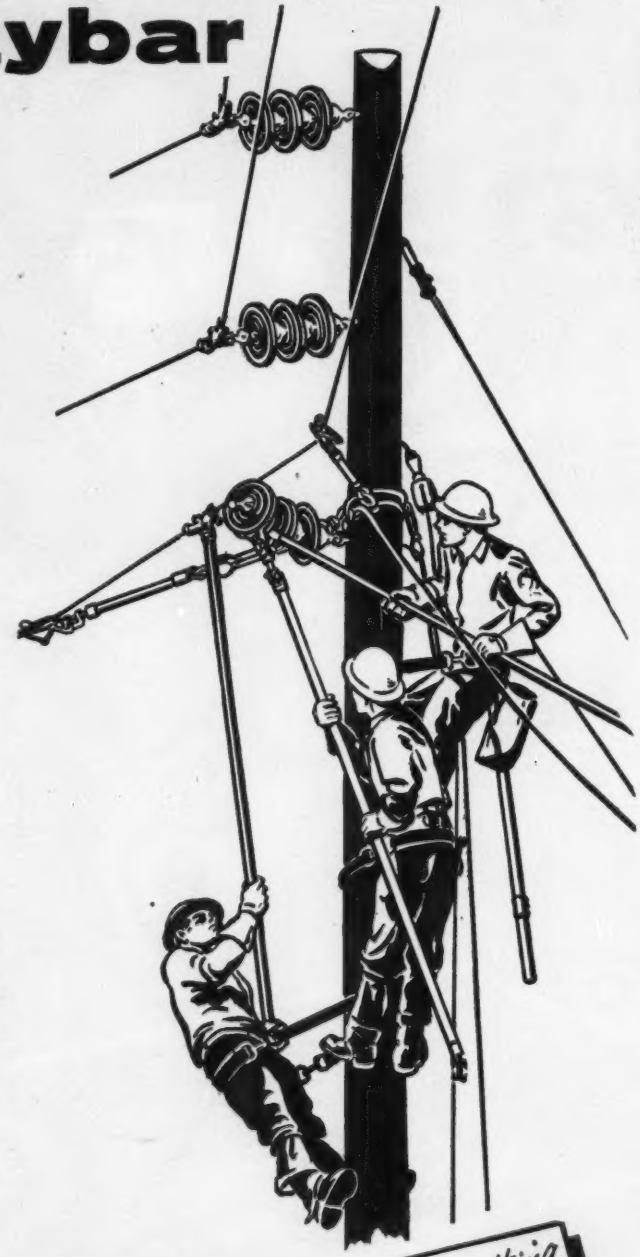
ALLIS-



CHALMERS

A-5224

HOT-LINE TOOLS and SAFETY ACCESSORIES ...via Graybar



Chance hot-line tools are products your linemen respect and use with confidence. There's a specialized Chance tool designed to do every hot-line job safely and efficiently.

Graybar can supply Chance hot-line maintenance tools individually or in sets. Incorporating the latest developments in equipment for handling energized lines, Chance tools are tested to withstand 75,000 volts per foot. Metal fittings are made of lightweight, heat-treated aluminum alloy . . . poles are laminated Sitka Spruce.

In safety accessories, Graybar distributes Salisbury protective devices of all types—rubber line hose and insulator hoods . . . rubber blankets and jackets . . . rubber coats, gloves and sleeves. All are top-quality, fully-guaranteed products made of the purest crude rubber.

Call Graybar for all of your other pole-line needs as well. You can rely on your local Graybar Representative to provide complete, accurate information on anything you require. For special help on out-of-the-ordinary problems, feel free to ask for the assistance of your nearby Graybar Outside Construction Specialist. Graybar Electric Company, Inc., Executive Offices: Graybar Building, 420 Lexington Avenue, New York 17, N. Y.

538-912

Call Graybar first for... Graybar Quality — *Everything Electrical*

IN OVER 130 PRINCIPAL CITIES

McAfee Explains Fee Paid Legislative Agent

Full text of his statement to Union Electric Board describes transaction. Grand Jury, SEC investigations begin

A federal grand jury convened in St. Louis last week to hear evidence in the case.

Securities and Exchange Commission investigators were also probing into the matter.

Object of both these efforts is to determine whether Union Electric Co or its agents violated the law in paying a $35,000 fee to a Chicago lawyer for supposedly guiding a bill through the Illinois legislature.

This particular bill, passed last year, permits Union Electric Co to fully merge an Illinois subsidiary into the parent Missouri Co. It enables the company to simplify bookkeeping and facilitates financing.

In the following statement, originally presented to his board of directors, Union Electric Co Pres J. Wesley McAfee describes the circumstances surrounding payment of the controversial fee:

McAFEE (LEFT) MEETS WITH OFFICERS Harry Williamson, A. H. Schettler, and John A. Woodbridge after being questioned by representative of Illinois Budgetary Commission.

I want to report to the board of directors on the matters relating to the company's action and activities in connection with the adoption in 1955 of an amendment to the statutes of Illinois which permitted the acquisition of our Illinois subsidiary by Union Electric.

I must say that the facts printed by the local newspapers, which most of you have read, are in the main accurately reported. We have made, and are still making, a determined effort to get all the facts surrounding this situation and to communicate them as quickly as possible. This summary which I will present to the board will give you all the salient facts as I know them to date, with the expectation that it will facilitate consideration by this board.

First, let me give you the background so that we may better understand what is involved and what caused our action in the first place.

For many years, Union Electric Co of Missouri had operated an Illinois subsidiary which furnished electrical power to a larger residential and industrial area across the Mississippi River from St. Louis. Our Illinois subsidiary was a separate company with an Illinois charter. Illinois law required this. From an operating standpoint, however, our Missouri and Illinois companies were one company—with a unified, co-ordinated generating and transmission system.

The results of this artificial separation of the two companies were both inefficiency and higher costs. This is a very technical matter but here are two samples of what separate maintenance of an Illinois company led to:

(1) It hampered our ability to raise money for future expansion of our Illinois facilities. The net effect of various regulations was that we could pledge the property of only our Missouri company as security on bonds. We could pledge the stock but not the property of our Illinois subsidiary. The stock was not as prime a security.

(2) Although our Missouri-Illinois system was physically and actually one, the paper presence of two companies required us to engage in constant and, actually, unnecessary bookkeeping as a result of having to draw up contracts for the purchase and sale of power between the two companies.

I want to emphasize, too, that the matter of tax savings was never an element in our desire to end the separate and dual existence of our Illinois subsidiary.

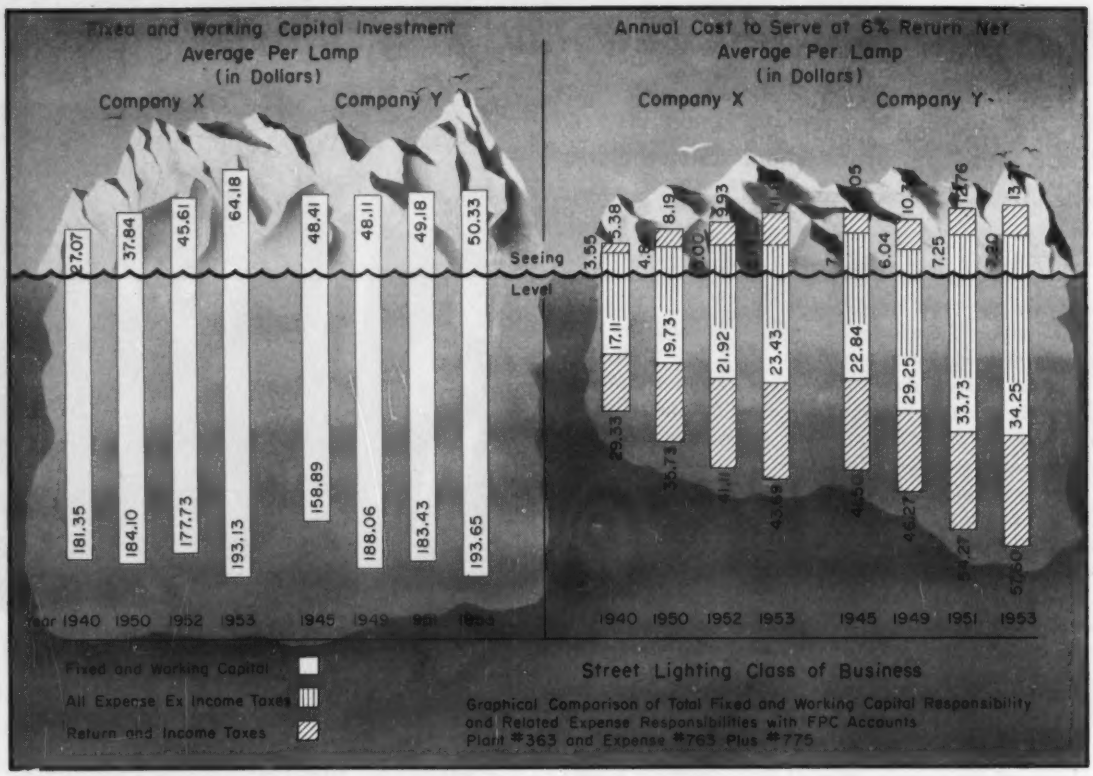
As a matter of fact, we will suffer a net tax loss in excess of $15,000 a year as a result of passage of this legislation. Our annual Illinois franchise tax will be reduced by $36,000, but our annual Missouri income tax—because of our formal acquisition of the Illinois property—will be increased about $50,000.

The problem caused by this provision of Illinois law was appreciated by many individuals and groups who have an understanding of utility matters. In 1951, the Illinois Public Utilities Laws Commission was appointed to recommend amendments to the Illinois Public Utilities Act—the act which contained the provision that required Union Electric to maintain a separate company for its Illinois subsidiary.

In its report to the 1953 Illinois legislature, the commission recommended that this provision be abandoned. It said:

"The suggestion has also been made that there be a provision inserted in Section 28 of the existing law to exempt public utility companies owning and operating a public utility system situated partly in Illinois and partly in an adjoining state or states so that these public utility companies do not have to have an Illinois charter. In order to conform to the requirements of the present Section 28 a utility company operating in various states must, as far

(*Continued on page* 18)



LIKE AN ICEBERG, whose greater bulk is below sea level, larger street lighting costs are below the "seeing level"

Street Lighting Can Pay Its Way

SALES
Commercial

- **Present rates for street lighting result in an average deficit of $12.31 per lamp per year**
- **It's possible for utilities to begin wiping out this deficiency and put street lighting on a paying basis**

WILLIAM S. LEFFLER, William S. Leffler Engineers Associated, Noroton, Conn.

Street lighting rates, as I have said before, are a "hot potato" (EW, April 4, 1955, p 84). But two things seem clear to me:

1. Present rates result in a sizable deficit for this class of service.

2. Return can be improved to reflect more nearly the full costs of serving street lighting.

A cursory examination of Federal Power Commission's uniform system of accounts might lead one to believe that the cost responsibilities of the street lighting class of business includes only the plant and related expenses. These are distribution plant account for street lighting and signal systems (account No. 363), distribution expense for operation of street lighting and signal systems (account No. 763), and distribution expense for maintenance of structures and improvements (account No. 765).

But these represent only a small portion of the total plant and expense responsibilities to provide street lighting. Actually the cost for rendering street lighting service should include also a portion of the expense recorded in the investment and fund account (No. 115), as well as the expense related to the street lighting demand and kwhr responsibility for production, transmission, distribution, general customers' accounting and collecting, sales promotion, administrative and general, depreciation, and taxes.

Thus, like an iceberg whose greater bulk is below the sea level, the larger street lighting cost responsibilities are below the "seeing level." This is illustrated in graph above. The quantities plotted here are from my earlier article (Street Lighting Rates Are a Hot Potato," EW, April 4, 1955, p 84).

From FPC's "Statistics of Electric Utilities in U. S., Privately Owned

Utilities, Year 1953," we can develop an approximate overall cost liability per lamp. The capital in street lighting and signal systems of Class A and B companies is $343,681,000. Street lamps number 2,989,000. This averages $114.97 per lamp. The operation and maintenance totals $26,253,045, or $8.78 per lamp.

If we assume that the investment in street lighting systems (FPC account No. 363) is as much as 50% of the total fixed and working capital responsibility of the street lighting class (It is certainly not that much.), then for all Class A and B privately owned systems in the United States the costing base responsibility for the street lighting class would be an average per reported lamp station of $229.94. A 5% net return with income tax liability would mean a return component of $23.96 per lamp per year.

Assuming that the expense of operation and maintenance of the street lighting systems (FPC accounts Nos. 763 and 775) is 40% of the total expense responsibility, exclusive of income taxes, for the street lighting class (It is probably less.), then for all Class A and B privately owned systems in the United States the average expense, or cost at 0% return, would be $21.95 per lamp per year.

$$\frac{100\%}{40\%} \times \$878$$

The revenue totals $100,448,000, or $33.60 per lamp station or 6.125¢ per kwhr for the 1,640 million kwhr.

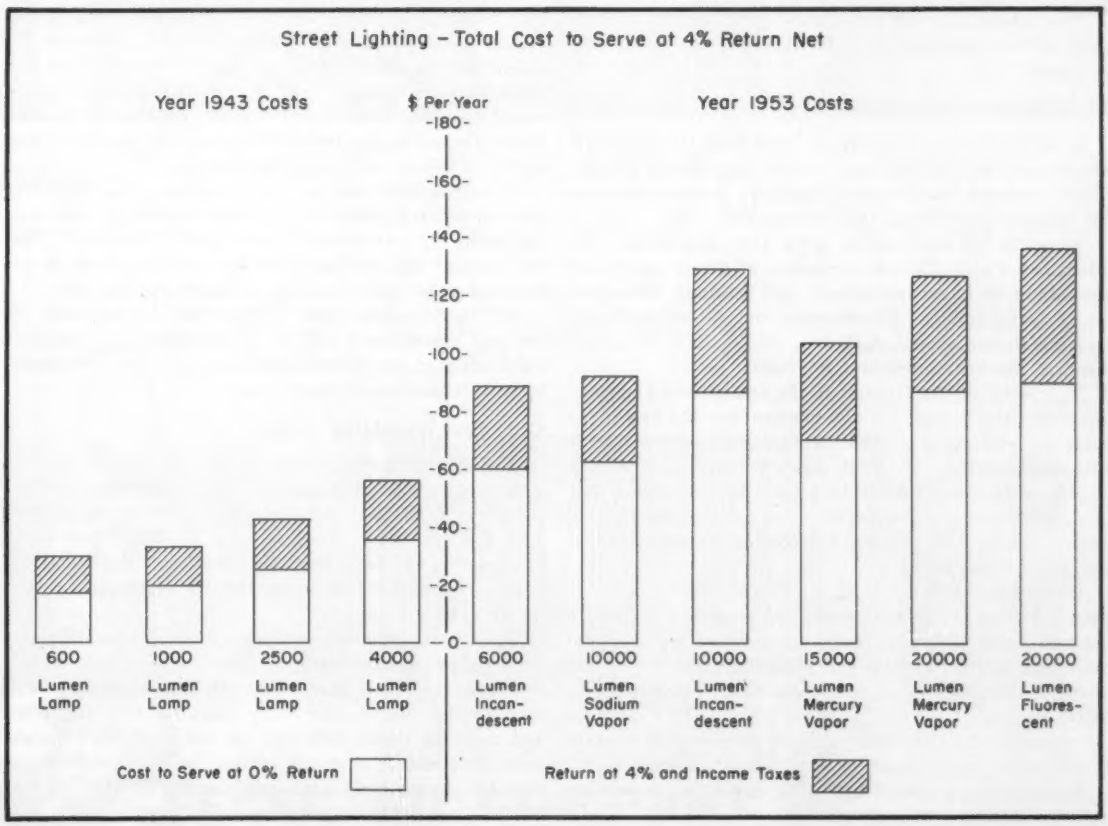
Thus, the total cost-to-serve at 5% return net would be $45.91 per lamp, per year ($21.95 expenses plus $23.96 gross return) versus the reported revenue of $33.60. This results in an average deficit per lamp of $12.31 per year.

The special report, "Light Up The Streets" (EW, Oct. 3, 1955) asserted that lighting adequately the 350,000 miles of residential, arterial, and business area streets would require some 10.5 million additional luminaires and 16 billion kwhr. Total street lighting revenue is estimated at $540 million, which indicates an average revenue of 3.375¢ per kwhr. No doubt these additional luminaires will be in the higher wattage groups which

Author's Observations

- I cannot agree that street lighting should never be expected to earn a fair rate of return on its investment responsibility.
- Discrimination against the small rate payer to favor the large taxpayer should be eliminated. There is no valid reason why utility customers should pay for street lighting as a part of their power bill. That's the taxpayer's responsibility. Regulatory bodies have upheld this opinion.
- Street lighting service provides only a small part of total revenue. Resulting substantial deficits therefrom should be pointed out to the municipal authorities as contributions by the Rate Payer to the Tax Payer.

HIGHER WATTAGE GROUPS afford an opportunity to price more realistically and thus improve net income for utilities



afford an opportunity to price realistically. These additional luminaires will increase the intensity of street illumination and can be made to increase the earned return from the street lighting class.

One way to improve the earned rate of return of the street lighting class is suggested by the graphical comparison of cost-to-serve various sized lamps burning 4,000 hours per year set forth in the graph or previous page.

Present street light rates costs were probably based on 1935-1940 costs for the smaller lamps so that replacement of the old luminaires carrying the old rate with higher rated lighting intensity luminaires at new rates which realistically meet 1956 costs, will increase street lighting revenue and its operating income.

An increase in the municipal budget for street lighting service might be approved when city officials are convinced that increased street illumination will benefit the community and ordinarily reduce (1) the annual cost per 1,000 lumens of street lighting provided, (2) reduce the annual cost of foot candles at pavement level, (3) increase the see-ability of all the traffic hazards to life *and* property, and most importantly (4) eliminate the discrimination which exists as long as the percentage contribution to the total non street lighting revenue by a rate payer, exceeds his percentage of the tax assessment.

With such a large segment of the utility industry trending from the traditional evening winter peak to summer daytime occurrence of peak loads on both production and distribution facilities, superficial observation might conclude that the street lighting class will be inherently off-peak. Nothing could be more fallacious. The reduction in the investment responsibility of this class would be less than 10% when charged with none of the high cost summer peak production and distribution facilities—under any logical costing procedure which would properly apportion to all classes, the excess unit costs of summertime temperature-affected capability of the distribution system.

McAfee Text (con't)—"These are the basic facts . . ."

as its Illinois operations are concerned, carry on through an Illinois subsidiary corporation. The proposed amendment would simplify the corporate structure of such utility companies and would present an opportunity to eliminate many problems which now arise, particularly with reference to the issuance of securities to finance the additions and extensions which are constantly required to serve the ever-increasing public demand.

"We believe that the above mentioned changes in Sections 28 and 90 of the existing Public Utilities Act should be made."

Bill Had Wide Acceptance

It is, I believe, important to note that the proposed amendment had the approval of several important groups. These included the Illinois Commerce Commission and the Illinois and Chicago Bar associations.

While the bill was pending in the 1953 Legislature, Mr. Richard J. Lyons, director of revenue of Illinois, expressed opposition to it on the ground that a utility subsidiary which ceased to be an Illinois corporation would no longer pay the Illinois capital stock tax. In the case of Union Electric, this tax amounted to $450,000.

As a result of this opposition, the first proposed amendment was not passed. It was obvious that the loss of so large an amount of revenue would have a very serious effect—particularly to school districts which were largely supported by these substantial taxes. It was evident that the amendment must be written so as to eliminate this tax loss if it was ever to receive favorable consideration by the Illinois Legislature.

Union Electric had, for 10 or 15 years, employed Mr. Henry Driemeyer, a prominent and respected lawyer of East St. Louis, to represent the company in many important legal matters in Illinois. With the exception of the matter now under discussion, these never involved legislative work.

Although Mr. Driemeyer was not on a regular retainer from us, we often sought his legal ability and counsel.

In this case, we asked him if he could find a solution that would achieve two things:

(1) Provide the school and other taxing districts with the amount of revenue they needed from our Illinois properties, while

(2) Relieving us of the internal inefficiencies, costs and long-term financial disadvantages of operating what is really one company as two companies.

Mr. Driemeyer undertook this assignment and worked out a plan to be incorporated in the proposed bill. This plan required us to pay annually an amount equal to the capital stock tax paid the year before Union Electric acquired the subsidiary. This, we felt, would eliminate the opposition, particularly since it removed the fear of reduced revenues to the school and tax districts. It required Union Electric to pay the stipulated amount each year and no loss would be suffered by the districts.

Mr. Driemeyer took up the proposed solution in the form of a new bill with the Revenue Department and with the taxing districts affected. Both groups approved. The bill was then put into final form and was introduced in the Legislature, on April 19,1955, as Senate Bill No. 485.

It is also significant that the new bill was supported by city and school board officials of Monsanto, Ill., the principal office of our Illinois subsidiary and the community most dependent on its tax revenues.

Only Four Dissenting Votes

This legislation was adopted in the Senate with but four dissenting votes. Subsequently it was approved unanimously in the House and signed by the Governor on June 15, 1955.

These are the basic facts regarding the bill and how it came to be written, recommended, introduced and passed by the Illinois Legislature.

There was, however, one point of departure from our fixed policy of more than 15 years. Union Electric has not had a legislative representative in Illinois—or anywhere else for that matter—for many years. I felt that if we had someone closely following the bill in 1952, we might have been able to promptly correct the revenue objection that Mr. Lyons had raised and possibly to have secured

(*Continued on page* 22)

Super Durabake A NEW FINISH FOR S&C METALCLAD SWITCHGEAR

Developed for rigorous outdoor or indoor service, Super Durabake withstands high temperatures, high humidities, blasting effects of wind and sand, and corrosive atmospheres. See below how this tough finish is achieved.

prevents rust, eliminates maintenance wherever installed

1 All enclosures are fabricated of scale-free, oxide-free, cold-rolled steel sheets, permitting a smooth, blemishless finish found only on top-grade consumer items.

2 Surfaces to be welded, later inaccessible, receive special preparation which consists of a phosphatizing bath plus an application of metallic zinc.

3 All welds are ground and sanded to remove the scale formed during welding. All internal welds, seams, joints, and splices are wire brushed.

4 The enclosure and all parts are phosphatized. This treatment removes any remaining grease or oil, etches the steel slightly, and forms a neutral, rust-resistant coating.

5 Metallic zinc in alkyd resin is sprayed on all inside and outside surfaces of the enclosure and all parts which are then baked in a huge oven at 300 degrees F.

6 A rust-resistant primer (zinc-chromate-iron oxide) is applied by the spray method to all surfaces. This coat is allowed to air-dry thoroughly before processing continues.

7 The finish coat, of melamine and alkyd resins, is hot-sprayed, permitting an unusually thick, homogeneous coating without runs, sags, or blisters. It is equivalent to a four-coat air-dry finish.

8 All parts are baked at 300 degrees F producing a hard, dense surface required for long life and smart appearance, impossible to achieve with air-dry finishes. Baking is done in an extra-large oven unique in the switchgear industry.

9 For added protection against ground moisture, a thick coat of asphalt paint is applied to the enclosure's bottom perimeter. A heavy coat of "Insulmat," a "no-drip" compound, is applied to the inside surface of the roof to prevent condensation.

S&C

ELECTRIC COMPANY

4421 Ravenswood Avenue, Chicago 40, Illinois

In Canada: S & C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ont.

"NOTHING TO IT!...Putting Up the

CARL HAWKINSON
Superintendent
Edwards Construction
Company
Geneseo, Illinois

"Nothing to it," says "Swede" Hawkinson. "First, slip the aluminum housing over the 2-inch support member and turn the housing *upside down*. Easy going—you're on top of the job, and in good working position—not underneath, working up like you are on other units."

"Hook up the primary. Terminals have tin-plated pressure-pad connectors to speed up the installation. The reflector assembly mounts on the housing with just three cotter-type hinge pins. Now, flip the reflector open to connect the leads. And see how the friction-type connectors save time."

LM

LINE MATERIAL

A McGRAW ELECT

New L-M Fluorescent Luminaire Is Easy!"

That's the word from Carl "Swede" Hawkinson. "Nothing to it . . . one man can do the job. All you need is a screwdriver, a crescent wrench, and a level."

For a fact, the new L-M fluorescent luminaire is *remarkably* easy to install. You will understand why, as you study the photographs and explanation by "Swede" Hawkinson, competent and well-liked superintendent of the Edwards Construction Company, Geneseo, Illinois.

And bear in mind—this easy-to-install design by L-M offers *many* exclusive engineering advantages. In addition, L-M's new fluorescent luminaires present a *new look* in street-lighting equipment. They are styled for handsome appearance, correct light distribution, and a lifetime of efficient, economical operation.

Outstanding Features of L-M's New 1957-Style Fluorescent Luminaire

Shipping: Unit comes in two separate packages to make it easy to handle. The housing is in one package; globe and reflector assembly are in the other.

Housing: One-piece aluminum housing with reinforcing ribs provides strong, rigid mounting. Aluminum housing also provides excellent heat dissipation. Neoprene gaskets seal globe to housing and support entry, provide weatherproof construction.

Ballasts: Ballasts are mounted directly to flat inner surface of aluminum housing. This allows maximum heat dissipation during operation.

Ballast leads have friction-type terminals. Wiring is completed quickly and easily without tools.

4-lamp units have two ballasts, with one lamp from each side paired to each ballast.

Reflector: Two-piece reflector has separate, efficient reflecting surface for each lamp. Assembly is hinged and retained by spring-type latches to provide easy access to input terminals, ballasts, internal wiring, and mounting clamps.

Opening or removal of reflector assembly is accomplished without removal of lamps from their sockets.

Lamps: Only unit available today designed to take both present and future very high output (VHO) fluorescent lamps.

Globe: One-piece Plexiglas® globe is strong, virtually free from strain. Unit is latched and hinged to open from either side to provide easy accessibility for installation, wiring, cleaning, or relamping. "Breather" holes are provided in bottom of globe. Holes are covered with fiber glass filters to keep out dust and insects.

Wiring: Input terminals accommodate wire up to No. 4 stranded. They are tin-plated for use with either copper or aluminum conductor. Input circuit is arranged for operation on either 2- or 3-wire system.

Get Complete Information

Ask your L-M Field Engineer or Street Lighting Engineer for more complete information. Or write Line Material Company, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

Shallow-type luminaire

Shallow type is available in 4- and 6-foot lengths to accommodate 2 or 4 lamps. The deep style shown in photos below is also available in 4- and 6-foot lengths. For other outdoor lighting applications, such as parking lots, store-front lighting, etc., other styles are available. L-M Street Lighting Engineers will cooperate with you in designing the best system for your area.

"Next, turn the whole assembly 180° to normal position. Level and tighten up two interior clamping screws, and lock the reflector assembly in place with three twist-lock hasps. The two-piece reflector has separate reflecting surfaces for each lamp."

"All right! Now you put in the four fluorescent lamps, swing the globe assembly up into latched position, and the unit is ready to be fired up. The whole installation can be done in a matter of minutes. *Nothing to it!* . . . Putting up the L-M Fluorescent Luminaire is *easy!*"

Street Lighting

"The legislation in itself has . . . no element of impropriety"

passage of the bill then. Accordingly, in 1955, we assigned Harry Williamson, our real estate and tax officer, to work with Mr. Driemeyer in working out this bill.

Early in April of 1955, Messrs. Driemeyer and Williamson reported to Mr. Dudley Sanford, our executive vice president, that we should employ a lawyer who was familiar with Illinois legislative procedures to handle this matter in Springfield.

Cites Reasons for Employing Lawyer

There were two main reasons for their recommendation:

(1) The fact that the upcoming 1955 session of the Illinois Legislature was expected to be both crowded and hectic. There was to be a legislative reapportionment. Some very controversial measures were scheduled for debate. Although the bill we were interested in was not controversial and was satisfactory to all parties concerned, its public appeal or interest was limited. There was a very real danger it would be lost in committee and not even come to a vote. They believed we needed someone to persistently seek a place for this bill on House and Senate calendars.

(2) The bill was, necessarily, highly technical. While its details had been carefully worked out, they thought a lawyer should be present in Springfield to answer any questions raised by legislators.

Mr. Driemeyer stated that he did not feel he had the legislative experience or the acquaintances to make him the proper lawyer to undertake the work. Mr. Williamson is not a lawyer and, in addition, was occupied with his regular duties in the company.

Mr. Sanford was told by Messrs. Driemeyer and Williamson that they had made some inquiries which led them to recommend a Mr. J. Roy Browning of Chicago as the best man the company could get to follow this legislation. They further reported to Mr. Sanford that Mr. Browning would accept this employment for a retainer of $7500 plus an agreement to pay three additional installments as the bill progressed through the Legislature. The total amount involved in the agreement was $35,000.

Mr. Sanford informed them that I was at that time on the program of the Southwest Electric Conference in Chandler, Ariz. He said he could not approve such employment without discussing it with me, but that he would take the matter up with me at the conference which he was going to attend.

Mr. Sanford did discuss this matter with me. I telephoned Mr. Driemeyer from Chandler. He told me that he had known Browning for many years; that he had a good reputation and that, in his judgment, Mr. Browning should be employed. In reply to my question about the amount of the fee proposed, Mr. Driemeyer pointed out that the full amount would be payable only if a good result were obtained and that in his opinion the amount was reasonable in view of the importance of the matter and the work which might be involved.

I had complete confidence in Mr. Driemeyer's judgment and character. Therefore, I ultimately authorized the employment of Mr. Browning.

Since I have returned to the city on Tuesday, Nov. 13, I have acquired some additional and important facts about the employment of Mr. Browning—facts with which I was not familiar at the time of my conference with Mr. Driemeyer. Since I propose to give this board all the information I have, I shall include these facts later in my report, in connection with specific points which the board should consider.

So much for the background of the legislation and the employment of Mr. Browning.

There are two questions which I should like to submit to the Board for its consideration: They are:

(1) Were the objectives of Union Electric improper?

It is my considered judgment that the legislation is in the public interest and in itself has absolutely no element of impropriety. As I have already explained, the legislation will enable Union Electric to improve its service and efficiency and to more easily expand its facilities as its area grows. It will not lessen—in fact, will slightly increase—our total tax burden. The fact that the legislation is meritorious has been somewhat obscured by the mass of other details reported, and its importance not fully recognized.

I say it is extremely important, for intentionally bad or immoral conduct is generally associated with bad motives and improper objectives.

So much for my views on the first question.

(2) The second question, and the one which I believe has resulted in the recent news stories is this:

Were the actions and activities in behalf of this legislation by Union Electric or representatives subject to criticism?

" . . . Mistakes Have Been Made."

On this critical question, I am sorry to report that in the light of what we know now mistakes have been made. It is our duty to face these mistakes, expose them to public view and to take all possible steps to prevent their ever happening again. Therefore, I will now cover, to the full extent of my knowledge, those actions which were questionable.

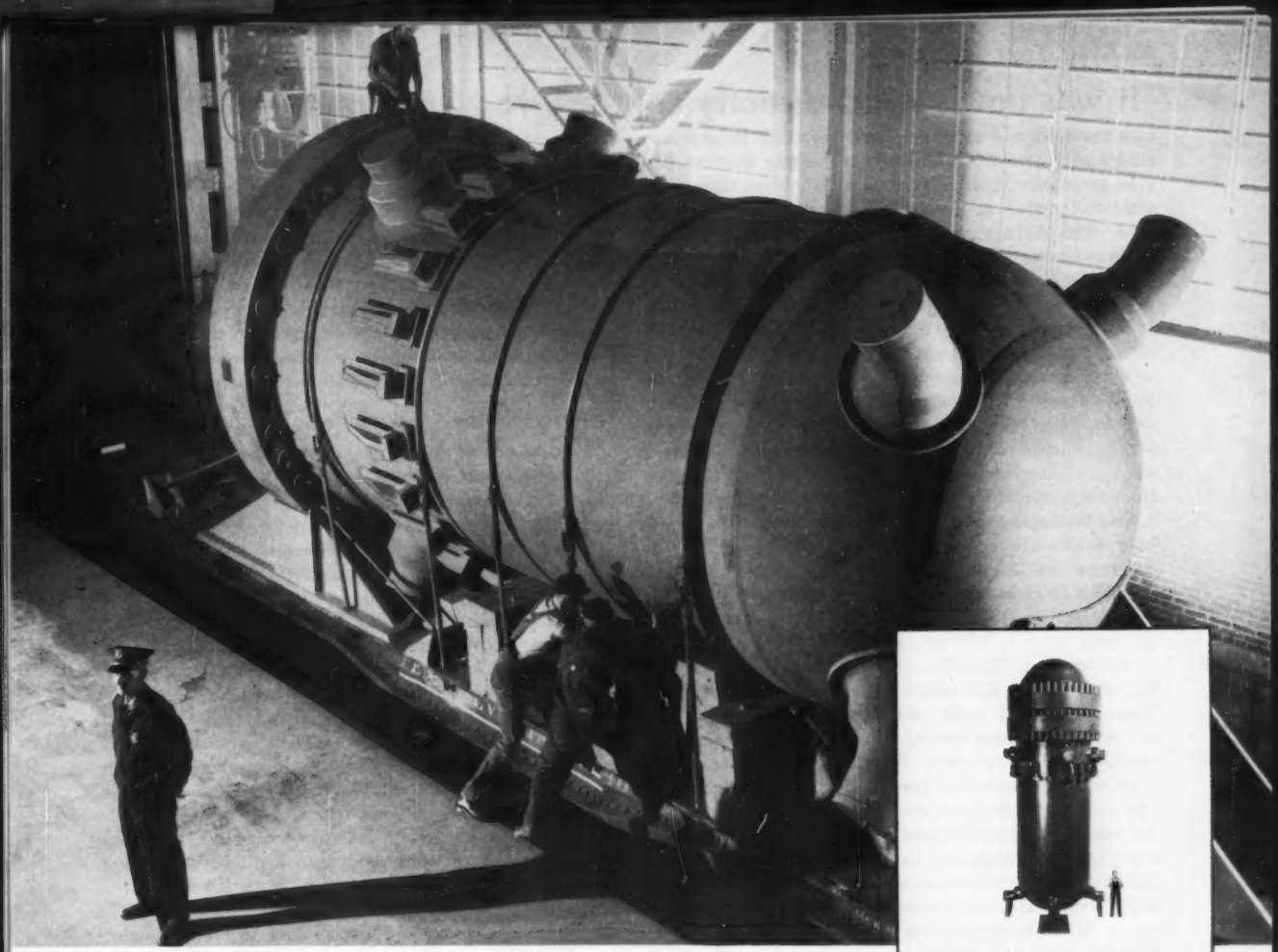
In the spring of 1955, Orville E. Hodge, of Granite City, was Auditor of the State of Illinois. He was then a very popular figure, had received a civic award as the Man of the Year in his home town of Granite City, and was widely regarded as having an unusually promising future. Although I did not know him personally, I understood that he was a respected person. However, his office of State Auditor had no official responsibilities or connection with the legislation concerning our Illinois subsidiary.

In 1956, it was discovered that Hodge had stolen large sums of money from the state by various devices and had also been connected with other improper activities. The disclosures created a great public scandal and Hodge, after pleading guilty, was sent to the state penitentiary.

Within the past few days, we have learned that the proceeds of all four checks drawn by Union Electric (three of them payable to Browning personally and one to his firm) went into a so-called Hodge "envelope account." This account was kept secretly for Hodge by a Chicago banker named Hintz, who is also now in the penitentiary.

I have also learned the following details of Browning's employment: Mr. Williamson asked several people for suggestions as to whom he should employ to represent us on this legislation. He had narrowed the selection down to two. He then went for advice to Hodge, whom he

(*Continued on page* 24)



Model of the Shippingport reactor vessel with removable head in place. The completed vessel stands 3 stories high, weighs 235 tons, with some large parts machined to tolerances approaching those obtained in watch-making. 217 tons of water will pass through its nuclear core every minute —at pressures in excess of 2000 psi.

C-E delivers the world's heaviest unit of nuclear power equipment

The photograph shows a milestone on the frontier of peacetime atomic power . . . the shipment of a reactor vessel designed and built by Combustion Engineering for America's first full-scale nuclear power plant. This huge vessel – which houses the nuclear reaction within steel walls 8½ inches thick – is the heaviest unit of atomic power equipment ever built. It was shipped on a special 9-car train and is being installed in the Shippingport (Pa.) Nuclear Power Station, designed by Westinghouse Electric Corporation under contract with the A.E.C. The station will be operated by the Duquesne Light Company and is scheduled to go into service in 1957.

New machines and new techniques were developed to make possible a manufacturing precision never before achieved in a unit of this size. The final machining operation required two months on one of the world's largest boring mills. It involved the use of new optical techniques to align matching machined surfaces to the extremely high degree of accuracy specified. C-E's 15-million-volt betatron searched for defects as small as a ⅛-in. length of toothpick in welded joints up to 10 inches thick.

Combustion is actively engaged in many nuclear projects, including the design and manufacture of a complete reactor system for a submarine. Its resources of highly specialized personnel and facilities for nuclear work will enable it to play as important a role in the future use of atomic fuels as it has long played in the generation of power from conventional fuels.

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"It was unwise and directly contrary to . . . company policy . . ."

had known for a long time and regarded as a friend. Hodge told Mr. Williamson that Browning was the best man to employ; that he and Browning were very close friends and that he would arrange the employment at once. Mr. Williamson said that he had no authority to engage anyone at that time, but he did ask Hodge to determine if Browning were available and what fee he would expect.

Hodge later called Mr. Williamson, reported that Browning would take the job and outline the terms of payment totaling the $35,000 previously mentioned. Meanwhile, Mr. Williamson had conferred with Mr. Driemeyer, who later informed him that I had authorized the employment. Mr. Driemeyer recalls that he mentioned to Mr. Sanford when recommending the employment of Browning that Hodge was one of those who recommended Browning.

Mr. Williamson then called Hodge and asked him to have Browning get in touch with Mr. Driemeyer. At that time, Mr. Driemeyer was in Urbana, Ill., on business. Browning reached him there by phone and they made a date to meet in Hodge's office in Springfield, Ill., on April 21, 1955.

The meeting was held, as arranged, in the lobby of Hodge's office. According to Messrs. Driemeyer and Williamson, they dealt solely with Browning. They went over the details and gave him a copy of the bill which had already been introduced in the Legislature.

They also gave him some factual material explaining the proposed legislation and its significance. The conference ended about noon and the suggestion was made that they ask Hodge to have lunch with them. They went into Hodge's office to see him. While Hodge could not join them at lunch, he did speak privately with Browning at the time. During the conference in the lobby of Hodge's office, Mr. Driemeyer gave Browning our check for the $7500 we had agreed to pay him at that time. (Browning has subsequently said that during his private meeting with Hodge he endorsed the $7500 check and gave it to Hodge.)

During their conference, Browning told both Mr. Driemeyer and Mr. Williamson that he usually made his headquarters in Hodge's office when he was in Springfield. He said they could get in touch with him or leave word for him there.

This is the sum of the information given to me by Messrs. Driemeyer and Williamson.

Browning Version Lists Hodge As Lobbyist

Browning's version of this meeting—as it has been reported to be—is that it was understood between him and our representatives that Hodge was to lobby for the bill while Browning did the legal work. Messrs. Driemeyer and Williamson flatly deny this.

This is a basic dispute of fact on which I shall comment further in this report.

As a matter of fact, the legislative session during which this bill was up for passage did prove to be one of the most hectic of recent times in Illinois and included a filibuster which stopped the work of the entire body for several days.

From time to time, I received reports of the progess of the bill. Under the existing circumstances, it appeared to be receiving unexpectedly good attention from the Legislature, and I was gratified when it ultimately passed.

Now let me cover some more recent events: While I was in New York on business last Monday, I received a phone call from a reporter who asked me how the payments to Browning were handled. I told him that my office did not attend to that part of the business but that in the normal course of events such payments would be by checks and the checks would be mailed to the recipient. I flew back to St. Louis and Tuesday began a detailed investigation into the entire matter.

Endorsements on Checks Differ

I examined the four checks. It was apparent that the endorsement of Browning's name qn the back of the last three checks was not made by the same person who endorsed the first check.

My inquiry also disclosed that the first check to Browning for $7500 was delivered to Browning on April 21, 1955—in the lobby of Hodge's office, as I mentioned previously—and that each of the remaining checks were taken by Mr. Williamson to Springfield, in an envelope with Browning's name written on it, and left with Hodge.

Mr. Williamson's explanation for not mailing the checks, as we normally do, is that he was going to Springfield anyway and thought he would see Browning there. When he didn't meet Browning, he thought it convenient to leave the checks with his friend Hodge, as Browning had suggested he do with any messages for him. Mr. Williamson also points out that these were checks, not cash, and that they could not legally be cashed unless Browning signed his endorsement on the back of them.

It is difficult for me to disassociate myself from what is now known of Hodge and his activities, in order to judge how I would have looked at the situation when Hodge was prominent and respected. It is obvious, however, that we did not follow a business-like procedure in our dealings with Browning.

This I do know: It was unwise and directly contrary to our long-established company policy to have so intimately included Hodge in either the employment of Browning or in making payments to Browning through Hodge's office in Springfield.

It is perfectly clear that a business as closely related to the public welfare and public government as is that of Union Electric should neither seek nor accept favors from public officials.

For 15 years we have followed the practice of taking up matters with public officials that related to our business strictly on the basis of merit and regardless of any personal relations with them.

We have felt that we could better carry out this policy by not employing legislative agents. Our contacts with them would necessarily be limited and our control of their activities would not always be satisfactory.

Eight or ten years ago, we contributed to the Missouri Utilities Association our share of the fees paid a lawyer hired by the Association to make a presentation to a Committee of the Missouri Legislature on a question affecting the whole industry. For a few years we were members of the National Association of Electric Companies, which is registered to lobby in the Congress. We resigned from this association several years ago.

"Employment of Orville Hodge was never authorized . . ."

These—and the employment of Mr. Driemeyer and, later, Browning, on this Illinois legislation—are the only instances of legislative expenditures by our company.

I doubt very much that there are many companies, utilities or otherwise, who have spent less on legislation than we have during this entire period.

Making an exception in the instance of this proposed amendment to the Illinois Public Utilities Act seemed justified to me at the time. Here was a measure supported by and agreed to by everyone directly concerned and everyone who studied it. This included the commission, the bar, taxing districts, etc.

The only influence we needed was the diligence necessary to get it to a vote and keep it from getting lost among the many other bills in the Legislature. The only effort we really had to make was to explain it.

While my investigation is not complete, the facts I can learn up to now do not indicate that Browning had anything to do with expediting the passage of the bill we were interested in. Browning claims to have penciled in a provision in the bill limiting it to companies which had property in adjoining states. However, that provision was already in the bill when it was put on the legislative calendar two days before Browning said he penciled in that provision.

As a matter of fact, we were surprised by the serious interest shown in this legislation by the public bodies affected and by leaders of the Illinois House and Senate.

We are now convinced that we were wrong when we assumed that legislative conditions might be such as to require the effort of a legislative agent for this bill.

Now for the crucial question, as I see it.

Browning says that Hodge was included in the employment and the fee. Messrs. Driemeyer and Williamson say that this statement is not true.

Why I Believe Driemeyer and Williamson

There is nothing in the investigation so far that enables me to give this board a conclusive answer to this question of word against word. However, I can now tell you why, on the evidence available, I believe Messrs. Driemeyer and Williamson.

I can also tell this Board without qualification that the employment of Orville Hodge was never authorized nor was it ever even suggested to me at any time in any conversation.

In this question of word against word, I must rely upon the only standard I know—the character and credibility of the people involved.

As I have said, Mr. Henry Driemeyer has an outstanding record and reputation. I have had many dealings with him and have never known him to depart from the highest standards of conduct. Mr. Harry Williamson has been a loyal employe of Union Electric, well-liked and respected by our organization.

On the other hand, Mr. Albert E. Jenner, Special Assistant Attorney General for the Illinois Budgetary Commission, has reported that Browning has admitted that, at Hodge's request, he submitted a fake predated bill on another matter not related to this one or to us in any way. This was a bill to the State of Illinois to help cover up some of Hodge's forgeries.

At least one of the details Browning gave of his meeting with Messrs. Driemeyer and Williamson is demonstrably untrue. These and other recent disclosures seem to me to seriously impeach Browning's credibility.

It is also significant that last February we sent Browning the original copy of the information return that we filed with the Internal Revenue Service. This showed that payments totaling $35,000 were made to Browning in 1955. Mr. Browning has never in the intervening nine months informed the company that such report was received.

Then again, there is the fact that this was a meritorious bill and, as I have recited, had the endorsement of all who had a direct interest in it.

There are now a number of investigations going on in this matter. These include:

(1) The Illinois Budgetary Commission;

(2) Various newspapers in the area.

I believe that it is in the interests of all concerned to disclose any facts we have. That is what we have been doing and will continue to do.

An announcement has been made that the SEC will also conduct an investigation. Two items have been questioned:

(1) Whether the Browning fee should have been included as a legal expense of acquiring the properties of the Illinois subsidiary in the application to the SEC. The legislation we proposed did no more than permit us to make the acquisition if and when we desired to do so. The legislation had nothing to do with the actual acquisition which was a subsequent and separate transaction and was so reported to SEC in full compliance with its regulations.

(2) Whether we were justified in listing the Browning fee as "legal expense" in our annual report to the Federal Power Commission. Browning is a lawyer. We believed that explaining the merits of this bill was a lawyer's job, as was guiding it through legislative procedures.

"Completely Public" Investigations Suggested

If we have a voice in any investigations of the matter, we will suggest that such investigations be completely public. It is entirely clear to me that we will be better off in the long run to develop the facts and face up frankly to such mistakes as we have made.

Under the circumstances, and pending completion of the various investigations, Mr. Williamson has asked that he be relieved of all duties which require him to deal with public officials or government agencies.

I have instructed the treasurer of the company to continue to make all disbursements by check and in the future to mail all checks to the payee. If there is any necessity to change this procedure in a particular instance, it will be done only if the request, in writing and giving the reason for the exception, is approved by the president, chairman of the board, or executive vice president.

A permanent decision can be made with greater assurance and fairness after all investigations in progress or prospect are completed.

In closing, I want to say to this board that I take full responsibility for the conduct of this business, including such mistakes as we make.

If there are details of which I am uninformed, that is a failure on my part.

Lack of knowledge may affect moral responsibility but it does not, in my view, lessen business or public responsibility.

Texas Meeting Airs Views on Distribution

Told cost bars underground residential service; longer life seen likely; cable described

UNDERGROUND DISTRIBUTION PANEL included W. J. Richard, General Cable; J. C. Smith, Commonwealth Edison, Prof. B. N. Gafford, University of Texas

Cost remains the chief obstacle to underground distribution for residential areas, where the demand is growing for such service, J. C. Smith, Commonwealth Edison Co, told the ninth annual Power Distribution Conference, Oct. 22-24, at Austin, Texas.

But simplification and the use of available components, Smith said, can cut underground costs to about twice that of overhead service. Today, underground service to homes cost up to ten times as much.

Cites Protection

Pointing out that in some instances owners or developers of one-story homes pay the initial cost differential, Smith said that full electrification of these homes might justify underground service at utility company expense. He noted that underground distribution is protected against storm damage and trees and might have a longer service life. Transformers, he noted, may remain above ground in enclosures or may be placed in semi-buried concrete cells.

Describes Insulation

Only cable suitable for direct burial can eliminate the cost of ducts and manholes in distributing underground to residential areas, W. J. Richard, General Cable Corp, declared. Cable, he said, should be buried 30 to 42 in. for protection against frost heaving, digging and insects and should be shielded at some places by concrete slabs or creosoted planks. Richard noted that trenching cables in and surrounding them with sandy loam is preferable to ploughing.

Richard recommended RH-RW and RHW synthetic rubbers and VF polyvinyl chloride as insulating compounds for low-voltage cable. Higher voltage cables up to 15 kv, he said, should have ozone-resistant, oil-base or Butyl-base insulation. He urged shielding for such cables, particularly for those above 3 kv.

Reports on Buried Units

It was reported by Prof. B. N. Gafford, University of Texas, and R. A. Bell, Electrical Service Co, that two special 15-kva distribution transformers buried 2 ft in the ground at Austin had demonstrated their ability to carry residential cyclic loading above their rating without exceeding 95C winding temperature. One was in sandy loam; the other was back-filled with clay replacing caliche beginning 3 ft underground. The loam-buried unit proved capable of dissipating losses of continuous 112% load; the rock-hole unit was good for 85%.

Concentrated industrial loads to which service continuity is important usually are supplied from distribution loops or double-ended substations, said J. E. Parker, Carbide & Carbon Chemicals Co, in presenting a paper prepared jointly with C. H. Lackey. For such loads, he said, circuit breakers are relayed to isolate faults by sectionalizing the loop and retaining unfaulted sections in service.

Gives Loop Functions

Motor characteristics, he said, are important to designing the protective system. Where continuous operation is more important than motor protection, under-voltage tripping is delayed.

Satisfactory operation of electrical systems serving oil refineries, chemical plants, and other large industrial customers depends upon proper protection and coordination between the industrial and utility systems, said J. M. McReynolds, Houston Lighting & Power Co. He noted that a loop supply system serves to interconnect generating sources as well as to serve industrial customers.

The utility, he said, must assume responsibility for coordinated protection in the loop, while insisting that the customer meet certain minimum requirements and that the industrial engineer acquire an understanding of the utility's relaying philosophy.

Time coordination is a frequent problem in relaying for industrial service, said McReynolds, adding that 2 to 4 cycles delay in tripping of instantaneous relays, set low enough to respond to circuit ground faults, prevents many momentary outages caused by short-duration surges.

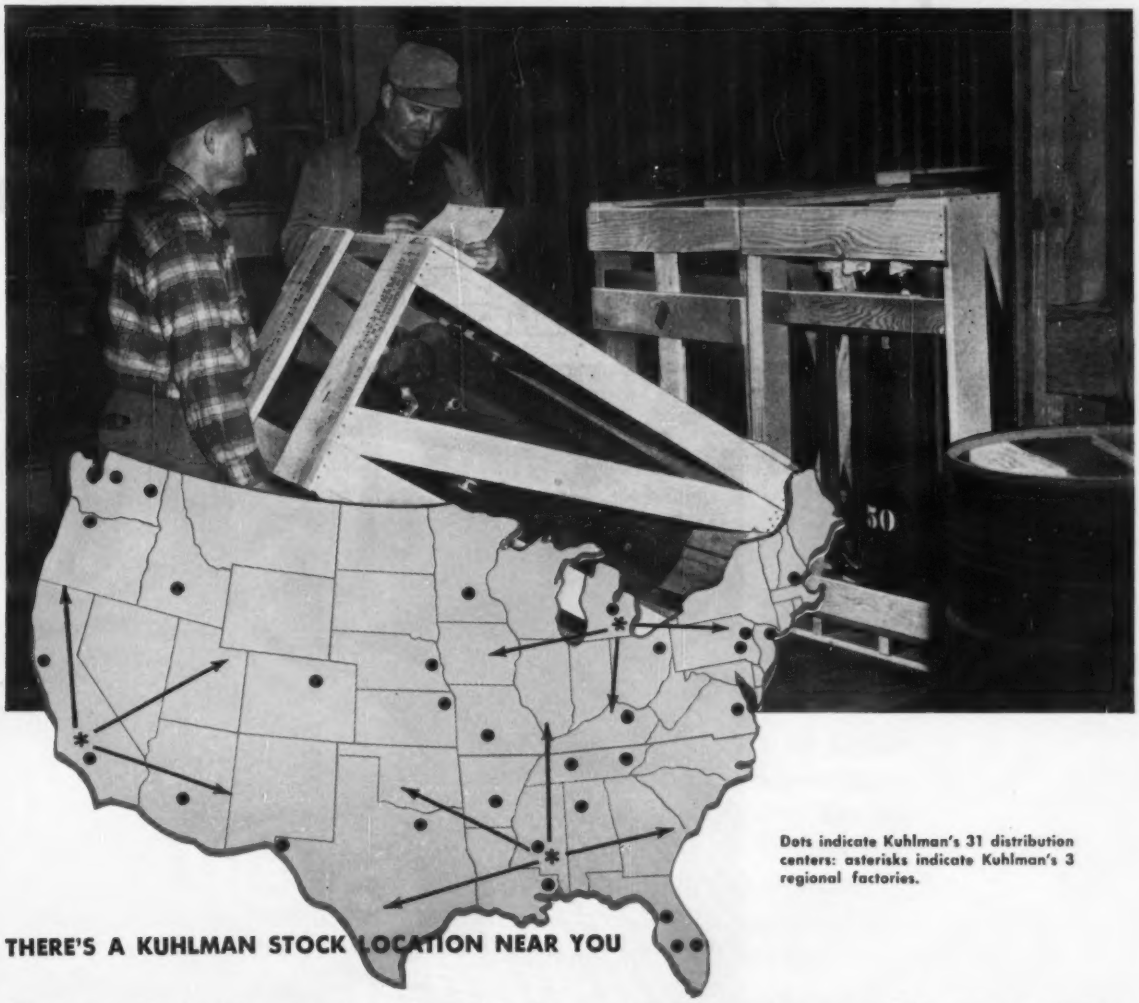
Urges Ungrounded System

A properly maintained ungrounded industrial distribution system can ride through a single ground fault without interruption, H. B. Thacker, Westinghouse Electric Corp, told the conference. The probability of outage is far less than on a grounded system, he said, adding that safety has little bearing on the selection of an ungrounded system. Grounding of motors and equipment frames is a distinct requirement.

(*Continued on page* 30)

Save Time!
Save Space!

ORDER KUHLMAN DISTRIBUTION TRANSFORMERS DIRECT FROM STOCK



Dots indicate Kuhlman's 31 distribution centers: asterisks indicate Kuhlman's 3 regional factories.

THERE'S A KUHLMAN STOCK LOCATION NEAR YOU

There's no waiting for shipments—no need to over-extend your own stock when you specify Kuhlman distribution transformers.

To better service your day-to-day requirements, Kuhlman distribution transformers can be shipped direct from stock to any part of the country. Three regional factories and thirty-one distributing centers are available to you at all times. Order Kuhlman and get the transformers you need—when you need them.

Ask your local Kuhlman representative to explain how Kuhlman's regional manufacturing and distribution facilities can work for you.

KUHLMAN ELECTRIC COMPANY

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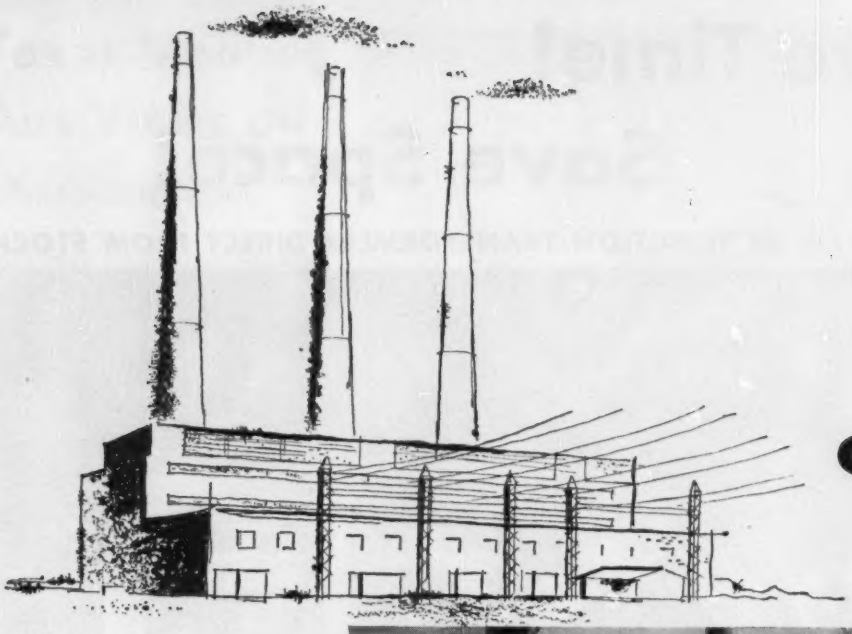
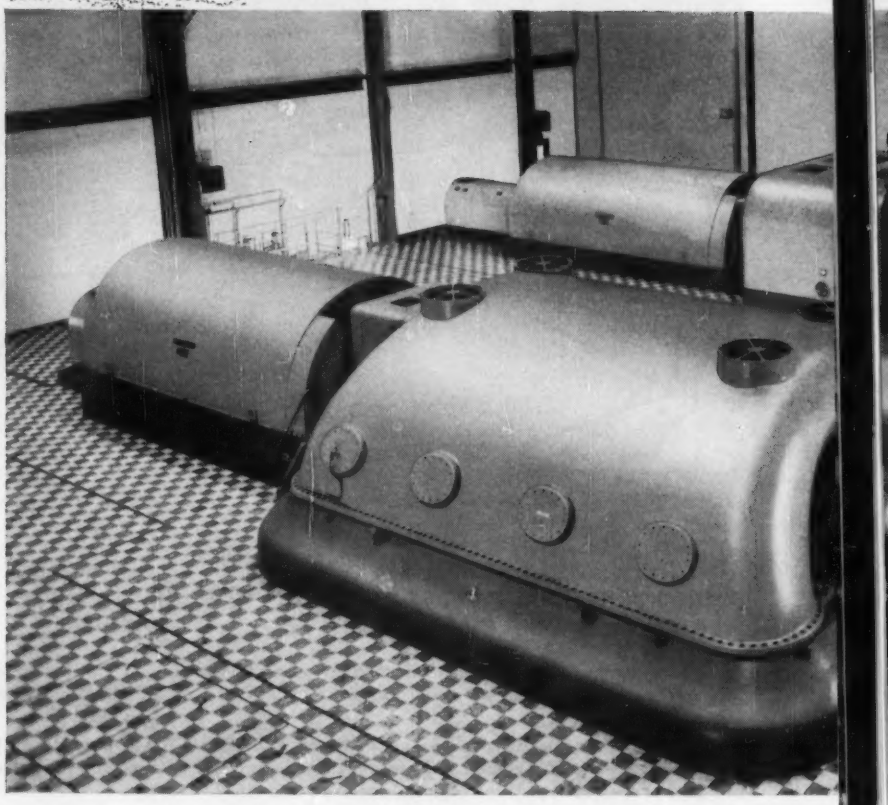


OVEC's

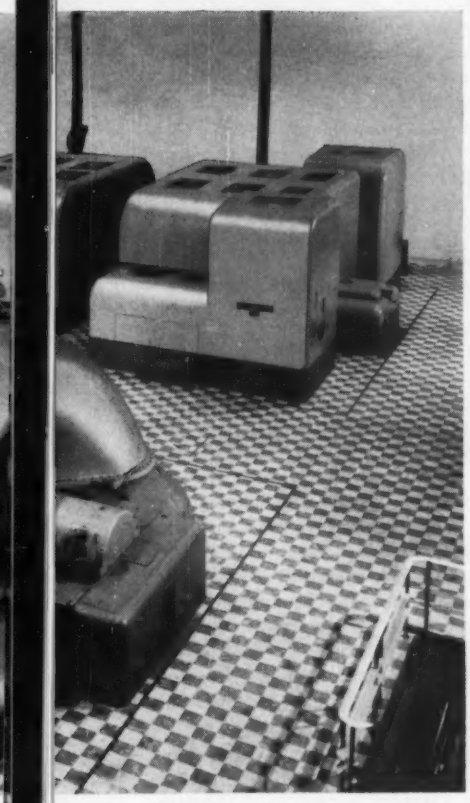


OVEC IS OWNED BY THE FOLLOWING PRIVATE ELECTRIC UTILITIES:

Appalachian Electric Power Company* • The Cincinnati Gas & Electric Company
Columbus and Southern Ohio Electric Company • The Dayton Power and Light Company
Indiana & Michigan Electric Company* • Kentucky Utilities Company
Louisville Gas and Electric Company • Monongahela Power Company** • Ohio Edison Company
Ohio Power Company* • Pennsylvania Power Company*** • The Potomac Edison Company**
Southern Indiana Gas and Electric Company • The Toledo Edison Company • West Penn Power Company**

*Subsidiary of American Gas and Electric Co. **Subsidiary of The West Penn Electric Co. ***Subsidiary of Ohio Edison Co.

Kyger Creek Station



...best heat rate
in the nation for 1955!

In the fast-moving race to higher and higher station efficiencies, Kyger Creek Plant of the Ohio Valley Electric Corporation placed first for the year 1955 according to figures released by the Federal Power Commission. The official rate was 9110 btu/kwhr.

Four of the five Kyger Creek turbine-generators are Westinghouse cross compound, double flow, rated 217,260 kw.

J-50591

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

Texas Meeting

(*Continued from page* 26)

A standard of service may evolve soon to guide the designing of distribution for adequate service, said B. M. Gallaher, Texas Electric Service Co.

Engineers have found advantages in the automatic sectionalizing of 12-kv distribution coordinated with feeder breakers, said Gallaher. Such sectionalizing uses reactors to limit feeder L-N faults to 3,000 amp and to reclose breakers about 50 cycles after initial tripping. It also requires expulsion cutouts so that ionized gases miss energized conductors and careful fuse selection.

Continuity Is Problem

Expanding system interconnections, close tolerances of tie-line controls, and economic dispatch have reduced frequency variations, said L. M. Olmsted, Electrical World. Like system capacity and voltage variation, frequency is declining as a cause of customer complaints. But service continuity, he said, remains a problem, principally because there is no common utility company yardstick for measuring it.

A preventive maintenance program has put Dallas Power & Light Co network protectors on a 3-year overhaul cycle by following up interim failure of relays to open, reported L. H. Cardwell. Overhaul was formerly on a yearly basis. Now drop-out tests every two weeks detect protectors ready for maintenance. The program includes frequent field inspections and making of records to point out definite system needs.

Heavier Loads Carried

Transformers probably can carry heavier loads longer and without excessive loss in insulation life than the ASA C57.92 guide indicates, said J. B. Hodtum, Allis-Chalmers Mfg Co. He demonstrated a new approach to determining hottest-spot temperature, relating ambient temperature, loading, and loss of life. This approach permits heavy overloads for infrequent short periods, provided the corresponding voltage drop can be tolerated.

No. 4 bare copper has been in place for 8 to 9 years on a 12.5-kv line near Galveston on which salt spray caused corrosion of aluminum and copper-clad conductor in 6 years, said J. B. Coltharp, Gulf States Utilities Co. The company also installed larger insulators, larger washers under spring pressure, wood crossarm braces, and over-insulated transformers and cutouts.

Reclosing Ineffective

Formerly, leakage current over line insulators started pole fires and line lockouts when a 40-mph spring wind from the Gulf of Mexico deposited salt spray, he explained. In such circumstances, reclosing was ineffective, and the line had to be sectionalized in order that service might be restored.

C. C. Bayley reported that Central Power & Light Co has trouble with salt-laden dust blown from fields and soil banks in dust storms as frequent as 74 days a year. Evening humidity settles the storm but also dampens the dust layers on line insulators. Severe leakage and crossarm burning result. The worst locations have insulators with 17-in. leakage distance, and insulators are washed with water from mains and irrigation canals.

Salt-spray and corrosion troubles in Los Angeles were overcome by oversize insulators, said E. G. Russell, Department of Water & Power. The insulators are washed with water spray as often as eight times a year, city water at 800 psi being used.

Paste soap and sometimes chemicals and abrasive blasting are required to remove some industrial and inert soil deposits on insulators, said A. D. Lantz, Ohio Brass Co. But hot-line washing, often removes soluble contaminants.

Reports Benefits

Although insulator design helps little, shielded leakage surface and over-insulation are effective under fog or dew conditions, he said. He reported benefits from using supplementary shields of plastic insulation and coating insulating surfaces with silicone wax or paste.

New ballasts facilitate fluorescent street lighting from series circuits, said K. D. Tobin, General Electric Co. Schemes to omit individual ballasts from series mercury units, if successful, will save up to 25% investment and up to 15% annual operating costs.

J. S. Franklin, GE, said that street lighting, when installed city-wide and according to recognized engineering standards, achieves satisfactory physical, aesthetic and economic values.

The conference heard F. R. Barnett, Richardson Foundation, Inc., urge that Americans create a moral climate conducive to a cold-war victory.

"We cannot guarantee our survival by merely staying ahead of the Soviets in science," he declared. "Private leadership must be trained to assume responsibility for intellectual and moral defense at the community level."

PEA Told Needs in Conductor Testing

There is an urgent need for a combined utility industry-manufacturer team approach in research programs to alleviate conductor vibration problems. Jon R. Ruhlman, technical director of Preformed Line Products Co, emphasized this at a meeting of Pennsylvania Electric Association's Transmission and Distribution Committee, Nov. 1-2, at Sharon.

Ruhlman said that difficulties encountered in laboratory testing with visual inspection of vibration specimens have imposed severe limitations on the validity of test results. However, recent improvements in use of radiographic techniques have helped overcome these problems. Radiographic methods allow continuous observation of the physical condition of the conductor section under the support clamp and armor rods without disturbing the test specimens and support materials.

There is an excellent correlation, Ruhlman said, between x-ray photographs and actual physical breakage occurring in cable elements protected by various armor rods. He established the validity of this method by comparing the x-rays with photographs of cable specimens dissected after extensive failure.

J. W. Enk described a dual-characteristic, slow-and-fast fuse link with time-current characteristics closely approaching those of the safe loading curve for distribution transformers. A. B. Chance Co has developed this new fuse link.

Enk said that the link has three main advantages: "Full use of available transformer capacity without reduction in transformer life, virtual elimination of transformer burn-outs due to overloads and secondary faults, and increased continuity of service." The links were designed specifically for use on single-phase transformers in the 2,400, 4,800, 7,200, and 14,400-v class.

ABOUT THE FINER POINTS OF METERING:

This typical test station in Florida exposes Sangamo J2 Meters to salt vapor atmospheres as part of Sangamo's continuous program of improvement.

Field tests prove corrosive atmospheres can't hurt J2 Meters

Longer meter life—even under the worst possible service conditions—is the subject of constant study and research at Sangamo.

The findings of continuous field tests since 1952 at salt atmosphere test stations on the coasts of California—Texas—Florida . . . corrosive industrial atmosphere stations in chemical industry areas, are the basis of the corrosion-resistant design of the J2.

All external and internal meter parts are given complete protection against all conditions of outdoor exposure. The use of rust inhibitors, oxide films, inorganic seals and special plating on all metal parts and the inert organic Selkyd meter base assure many years of maintenance-free service under the toughest conditions.

And remember, the J2 Meter is the *slow speed* meter—only 10 revolutions per minute at full nameplate rating—another reason why the J2 is your best investment in a watthour meter.

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JM56-7

Harllee Branch, Jr. to Head Southern Co

Succeeds McManus, who moves to new post of vice chairman: McDonough becomes president of Georgia Power; Oliver, new executive VP

Harllee Branch, Jr, president of Georgia Power Co, an operating subsidiary of the Southern Co, has been elected president of the parent company, it was announced recently at a board of directors' meeting.

Branch will succeed C. B. McManus, former president of the Southern Co, who has been named to the newly formed position of vice chairman of the board. Eugene Yates remains as chairman.

John J. McDonough will replace Branch as head of Georgia Power, and J. M. Oliver becomes new executive vice president and general manager of the utility.

Branch has been associated with Georgia Power Co since 1949 when he joined as vice president and general manager. He remained in this post until 1951 when he was named president of the utility. Before coming to Georgia Power, Branch had served as a member of the law firm of MacDougald, Troutman, Sams, & Branch, general counsel for the company. He had been with the firm since 1931 and had handled legal matters for Georgia Power for more than 18 years.

Branch, a graduate of Davidson College and Emory University Law School, was elected a director of the Southern Co in 1953. He is also a director of Southern Services, Inc. This past June he completed a one-year term as president of the Edison Electric Institute. He is also a former president of Southeastern Electric Exchange and of the Atlanta Bar Association. Branch last year was named by the Chamber of Commerce of the United States to membership on its 31-man policy committee.

McManus, along with his new duties as vice chairman, will continue to exercise his responsibilities in connection with operating problems. He started at Georgia Power Co in 1927 as superintendent of district operations, was made assistant operating manager in 1929 and assistant to the president in 1945.

McManus advanced shortly to vice president and director of operations, serving in this capacity until 1947 when he succeeded the late Preston S. Arkwright, Jr, as president.

Previous to his association with Georgia Power Co, McManus had joined Alabama Power Co shortly after graduation as an electrical engineer from Alabama Polytechnic Institute. He is former administrator of the Defense Electric Power Administration.

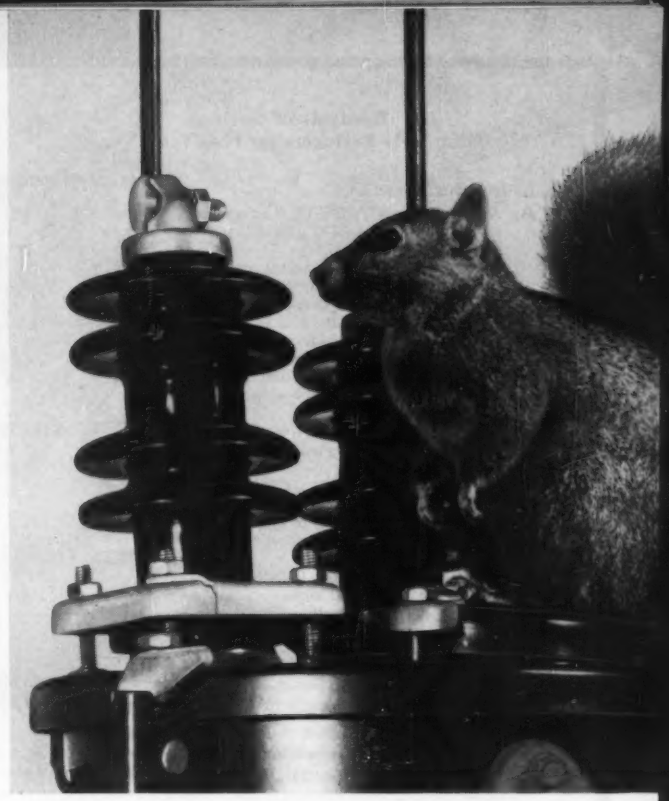
McDonough joined Georgia Power Co in 1927 and served in various supervisory and managerial posts until his promotion to vice president and Atlanta Division Manager in 1950, (see p 9).

Oliver, after serving Georgia Power for 23 years, was named vice president and general manager in 1951 to fill the vacancy left by Branch's promotion as president and kept that position until his present promotion.

C. B. McMANUS

J. M. OLIVER

Nut Bites Squirrel... Costs Utility $3000



You'll never believe it—we didn't either, but it actually happened! A curious squirrel evidently took a bite of the nut on the connector on top of a 7620-volt transformer—with the inevitable result. The nut bit back!

The squirrel's flaming body dropped into the dry grass below, which caught fire and in turn set the pole ablaze. Eventually the pole burned through, dropping primary wires onto the secondaries below.

Result: the pole had to be replaced—and so did some 30 television picture tubes in customers' homes. The whole deal was embarrassing and costly to the utility company—and to the squirrel's family also, which probably still has never satisfactorily explained to the neighbors what happened to Pappy.

It Can't Happen Here... on L-M's New Bite-Proof Transformer Bushing

This new bushing is designed to take the tap vertically, conforming to EEI-NEMA standards. Not only does it have a hand-tightening knob (which can't be spun off—but can be intentionally removed) but also it has a phenolic cap which covers the terminals completely. No hot nuts or other live parts are accessible.

If you use bare wire jumpers, we suggest a neoprene sleeve, as shown. The phenolic cap is constructed so as to provide adequate drainage.

On protected transformers a 3/16-inch slot is provided for the lightning arrester terminal. Nothing except the most persistent hummingbird sitting on the arrester could reach the hot terminal—and that's pretty unlikely.

This new bushing is representative of the many plus features found only in L-M Round-Wound Transformers®—and another reason why you should order more L-M Round-Wounds. Ask the L-M Field Engineer to tell you other reasons for buying these outstanding and highly efficient transformers. Or write Line Material Co., Transformer Div., Zanesville, Ohio.

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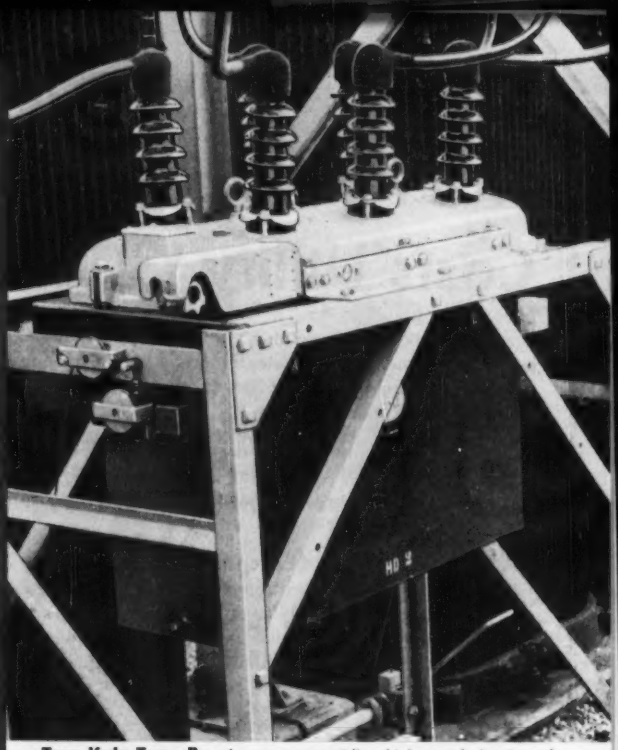
LINE MATERIAL Transformers

A McGRAW ELECTRIC COMPANY DIVISION

Analysis of Savings Using Kyle Reclosers for Five Years*

	Savings on 100 Substations	
I. Initial Investment Costs		
A. At substation. A Type R OCR as compared with an equivalent OCB with AC tripping and reclosing.		
1. Initial savings in equipment costs favoring each OCR—$3227.00. Total savings for 100 substations for 5 years— 2 x 5 x 100 x $3227/20.....	$161,350.	
2. Initial savings in labor costs to install transformers and wiring necessary to operate OCB—$30 per OCR. Total savings for 100 substations for 5 years— 2 x 5 x 100 x $30/20.....	1,500.	
Total initial investment savings with OCR's		$162,850.
B. On distribution feeders with 5 sectionalizing points per feeder.		
1. Equipment costs of 3 OCR's and 2 sectionalizers exceeding that of 5 fused cutouts = $491. Additional costs to utilize self-protective scheme for 200 feeders for 5 years = 5 x 200 x $491/20.....(—)	$ 24,550.	
2. Labor costs of installations. OCR exceeding that of fused cutout = $15. Additional cost to utilize self-protective scheme for 200 feeders for 5 years = 5 x 200 x $15/20.....(—)	750.	
Total additional costs of OCR's and sectionalizers over fused cutouts.....		— 25,300.
C. Net savings in initial costs with OCR's....		$137,550.
II. Operating Costs (estimated 9 outages per feeder through transient conditions annually)		
A. Savings in frequency and duration of service trips resulting from transient faults		
40 man-hours @ $5/hr. per feeder.	$200.	
25 truck hours @ $1/hr. per feeder	25.	
Cost of fuse links per feeder.....	5.	
Total cost of transient outages per feeder.....	$230.	
Total 5-year cost for 100 substations = 5 x 2 x 100 x $230.....	$230,000.	
B. Increased revenue resulting from reduced outages. 1500 KWH per outages per feeder for 5 years through loss of service @ 2¢ per KWH = 1500 x 2 x 100 x 5 x $.02.....	30,000.	
C. Total savings from transient fault protection for 5-year period.....		$260,000.
III. Maintenance Costs		
A. OCR and sectionalizer maintenance cost @ $25 per unit annually = $25 x 5 x 2 x 100 x 5.....(—)	$125,000.	
B. OCB additional relay calibration costs @ $25 per unit annually = $25 x 2 x 100 x 5.....	25,000.	
C. Total additional costs of OCR and sectionalizer maintenance for 5 years.....		— $100,000.
IV. Carrying charges (conservatively estimated as 10% annually of initial capitalized investment)		
A. At substation. Savings represented by OCR's = ($3227 + $30) x 2 x 100 x 5 x .10.....	$325,700.	
B. On line, additional cost of automatic scheme = ($15 + $491) x 2 x 100 x 5 x .10....(—)	50,600.	
C. Savings in carrying charges with OCR's and sectionalizers.....		$275,100.
V. Subtotal.....		$572,650.
Additional savings resulting from Transient Fault protection		
VI. Savings realized by elimination of conductor and equipment damage through extra-fast clearing on heavy faults.....		$?
VII. Value of improved public relations realized through better continuity of service.....		$?
VIII. TOTAL SAVINGS.....		**Well over half a million dollars!**

**Costs are conservative estimates based on the best available information from utilities. System used to illustrate average installation consisted of 100 substations each with two 15 kv feeders, and amortized in 20 years.*



Two Kyle Type R reclosers are providing high-speed clearing of 13.8 kv feeders for transient fault protection and automatic disconnecting of permanent faults with minimum substation investment.

How Heavy-Duty Substation

The application of Kyle reclosers as the automatic disconnecting device in substations eliminates the relatively high costs of circuit breakers and associated substation equipments. This alone offers savings of a half million dollars or more in five years, based on 200 feeder positions.

Lower Initial Costs

Initial investment in Type R recloser equipment of equivalent rating will result in approximately $3,000 savings per feeder. In addition, field reports indicate that labor for installing Type R reclosers is about 50% of that for circuit breakers. The maintenance cost for reclosers is also lower than for circuit breakers.

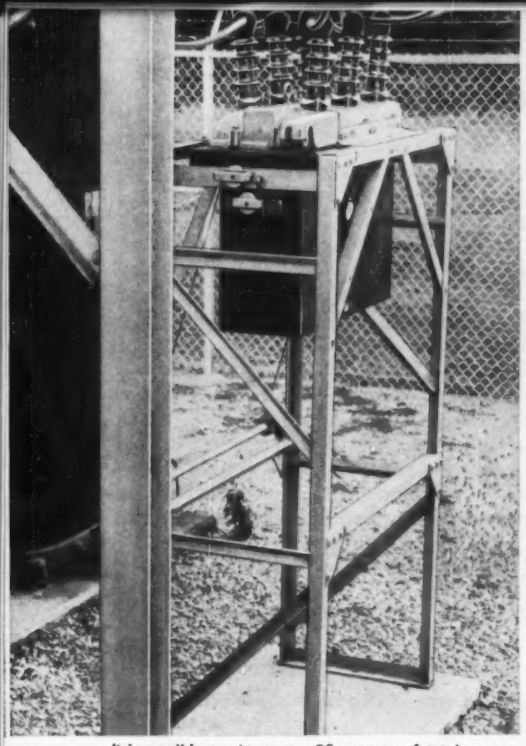
Fewer Outages

L-M Kyle reclosers can also be justified as a fault-protective device that will reduce the number of outages caused by transient or non-persistent causes. Kyle reclosers have extremely fast opening characteristics, clearing circuit in less than 2 cycles, which minimizes conductor burndown and increases service continuity.

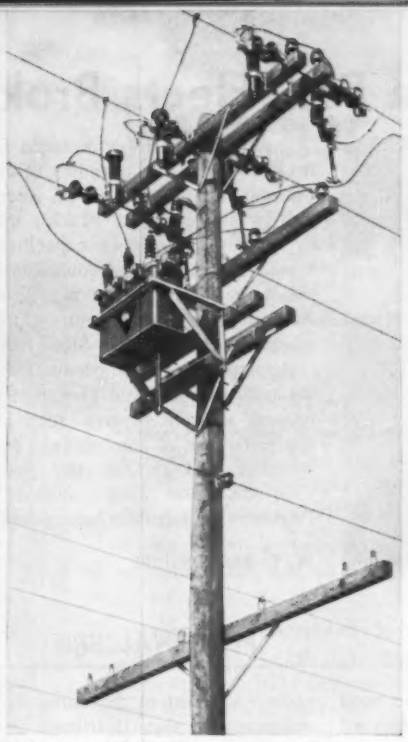
Compare the figures at the left with your construction and operating costs and see how you can save over a half million dollars with Kyle reclosers.

LINE MATERIAL

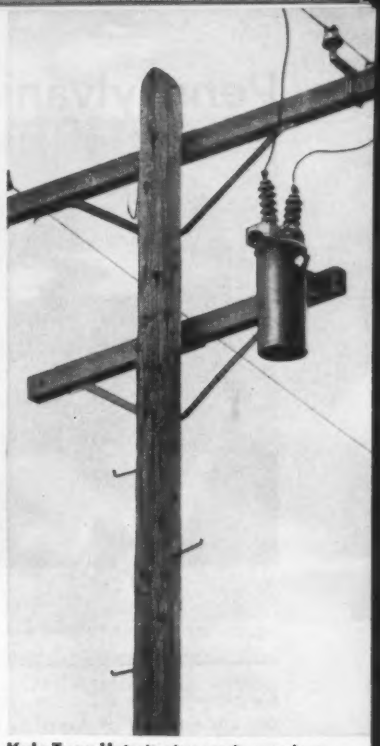
A McGRAW ELECTRIC COMPANY DIVISION



It is possible to clear over 90 percent of total circuit faults and reduce permanent faults with high-speed Kyle reclosers.



Kyle Type 3H 3-phase reclosers provide coordinated protection on rural lines with up to 1250 amperes at 14.4 kv. Where faults persist, recloser locks open on all 3 phases and confines trouble to a small area.



Kyle Type H single-phase recloser reduces the number of outages on rural lines caused by conductors whipping together on long spans, small branches grounding a conductor, or a lightning discharge.

Kyle Reclosers Reduce Investment And System Operating Costs

L-M high-speed reclosers provide better service continuity and lower operating costs by reducing conductor burndown caused by transient or non-persistent faults on the system. It is possible to clear over 90 percent of total circuit faults and reduce permanent faults with high-speed Kyle reclosers. Such faults are often caused by lightning, arrester flashover, tree limbs shorting the conductors, or conductors whipping together on long spans.

Eliminate the Shaded Area

The shaded area in the chart at right represents the additional fault-clearing ability of L-M high-speed Kyle reclosers. Kyle reclosers clear transient or non-persistent faults on the circuit with no significant damage to the system or interruption of service.

All Kyle reclosers can be coordinated in series to provide complete transient protection over entire distribution system.

Get Complete Information

Ask the L-M Field Engineer for more information on how Kyle reclosers can be profitably applied to your system. Or write Line Material Company, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

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Kyle® Reclosers

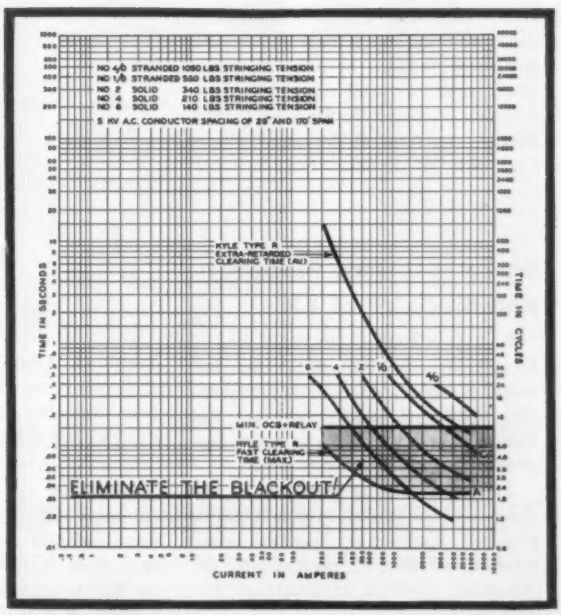

NO 4/0 STRANDED 1050 LBS STRINGING TENSION
NO 1/0 STRANDED 560 LBS STRINGING TENSION
NO 2 SOLID 340 LBS STRINGING TENSION
NO 4 SOLID 210 LBS STRINGING TENSION
NO 6 SOLID 140 LBS STRINGING TENSION
5 KV A.C. CONDUCTOR SPACING OF 28" AND 170' SPAN
KYLE TYPE R EXTRA-RETARDED CLEARING TIME (AV.)
MIN. OCB+RELAY
KYLE TYPE R FAST CLEARING TIME (MAX.)
ELIMINATE THE BLACKOUT!
TIME IN SECONDS
TIME IN CYCLES
CURRENT IN AMPERES

Chart shows primary line burndown characteristics for weatherproof wire. It also gives the maximum clearing time for high-speed Kyle reclosers and minimum clearing time for the average circuit breaker plus relay time. The shaded area represents the additional protection that can be obtained with Kyle reclosers in place of circuit breakers.

Pennsylvania P&L Elects Brokenshire VP

W. S. BROKENSHIRE

Pennsylvania Power & Light Co has announced the promotion of W. S. Brokenshire as vice president of engineering. He takes over his new post with the retirement of George M. Keenan.

Brokenshire joined PP&L's engineering department in 1924 and served in various engineering capacities until 1943. Previous to that he interrupted his engineering education at the University of Cincinnati to serve in the Army during World War I; was appointed to the United States Military Academy from there and following graduation, completed his engineering studies at Pennsylvania State University in 1924.

Appointed assistant production engineer of PP&L in 1945, he represented the utility on material procurement during the Korean conflict. In 1953 he became assistant superintendent of construction and later in the same year superintendent of construction. Prior to his new post, Brokenshire was named assistant chief engineer this past June.

In addition to being a member of the Pennsylvania Society of Professional Engineers, Brokenshire belongs to the American Institute of Electrical Engineers.

PERSONAL BRIEFS

Connecticut Power Co has announced the appointment of **Ansel A. Packard** as assistant to the president.

Portland General Electric has promoted **Joseph L. Williams** from assistant distribution engineer to assistant to the vice president.

Lewis H. Day, formerly general manager of the Sacramento County, Calif., Chamber of Commerce, is new director of area development for Iowa-Illinois Gas & Electric Co.

Montana Power Co has announced the formation of a new claims department managed by **John H. Mack** and a new land and right-of-way department, headed by **Stephen C. DeMers** . . . Also at Montana Power Co **John W. Cromer** has been advanced to assistant superintendent of transmission and distribution; and **Roger A. Hofacker** becomes purchasing agent replacing **George Nelson** who will retire Jan. 1.

Former supervisor of Northern States Power Co's testing laboratory, **F. P. Tierney,** has been named to the newly-created post of general superintendent of maintenance and testing.

Montana Rural Electric Cooperative Association has elected **Judd Walker** president, succeeding **George Lackman** who remains on the board of directors . . . The Montana Transmission Co-operative elected **State Sen Charles H. Mahoney** as president at its annual meeting.

Edward V. Amerman was promoted to commercial manager in Public Service Electric & Gas Co's commercial office at New Brunswick. Amerman succeeds **James L. Housel** who retires after 47 years service.

Joseph O. Chambers, vice president of West Penn Power Co, has been given the staff responsibility for the utility's engineering functions.

Duke Power Co has designated the following men in new positions: **J. D. Sloan** assistant manager of the Charlotte office, **J. M. Gaines** manager of the Hendersonville branch, and **F. L. Yarbrough** manager in Brevard.

Leslie W. Rivard will succeed **Chester R. Schmansky,** retired, as superintendent of Detroit Edison's Delray power plant; **John R. Hamann** will succeed **Raymond B. Harris,** retired, as superintendent of the Conners Creek power plant; and **Ernest W. Spring** succeeds **Casper F. Ries,** retired as superintendent of substations.

R. J. Reideler, formerly Cherokee district manager of Iowa Public Service Co, has been elected manager of the Rockwell City-Lake City district.

Boston Edison Co has named **Benjamin H. Weiner** as a supervising engineer on the staff of vice president **H. W. H. Wellington.**

Infilco, Inc, announces the election of **E. G. Kominek** and **A. A. Kalinske** as vice presidents.

John T. Henderson, principal research officer of the National Research Council, Ottawa, Canada has been named president of the Institute of Radio Engineers for 1957, **Yasujiro Niwa,** president of Tokyo Electrical College, becomes new vice president.

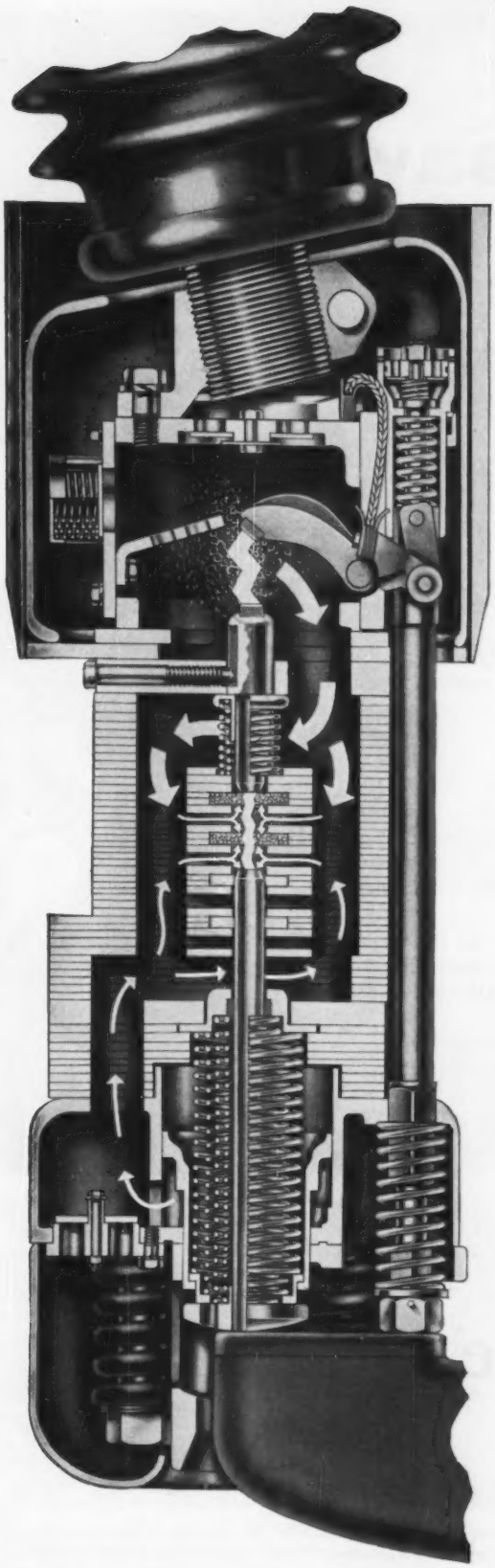
Barker Becomes President and Black VP of EJC

Engineers Joint Council has elected Joseph W. Barker, president, Research Corp of America, as president; and Fischer S. Black, publisher and Editor, ELECTRICAL WORLD, as vice president.

Barker is retiring president of the American Society of Mechanical Engineers. Black is an alternate board member of the EJC representing the American Institute of Electrical Engineers.

OBITUARY

John L. Hannan, 66, retired vice president and general counsel of Lynn Gas & Electric Co, died at his Massachusetts home of a heart attack.



No other interrupter offers all this

Greater system stability . . . duration of faults is sharply limited, thus keeping them from lowering effective machine voltages and reducing synchronizing power. The result is better service continuity.

Shorter arcing time . . . plenty of fresh oil is brought across the entire arcing path, cooling the arc and removing ionized gases. Insulation is increased so that the arc cannot re-establish itself after current zero.

Reduced arc energy . . . arcing time and arc length are reduced. An arc so restricted has low arc voltage, low energy.

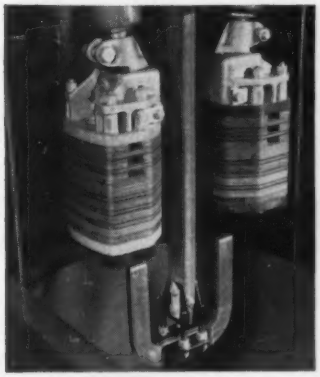
Lower maintenance . . . low arc energy during interruption limits oil carbonization and lengthens contact life. The entire grid is designed for easy, simplified inspection of contacts and parts without dismantling.

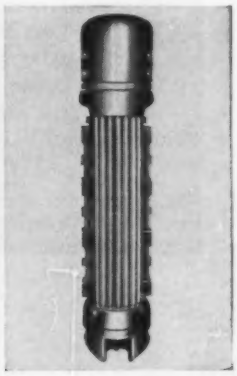
Longer oil life . . . carbonization is reduced, interruption quicker. "De-ion®" grid breakers maintain necessary insulating level through more interruptions than other types.

High-power laboratory tested . . . complete verification of all interrupting ratings.

Here is reliability that means freedom from the inconvenience and worry about faulty operation. De-ion grids have proved, through years of trouble-free service, that they can be depended upon to do their job quickly and efficiently.

J-60889





Above is a cutaway view of the Multiflow grid showing the path of the oil in quenching the arc. The Multiflow grid is used on breakers rated 69 kv and above. At the right are the Magnetic and Tubular grids used in breakers rated 69 kv and below, and high capacity 138 kv and above, respectively. These grids have proved, in service, that they have no equals in efficiency and reliability.

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

Utilities can save up to 75% in soundproofing

with new Westinghouse power transformers

Westinghouse announces drastic reduction in premium costs paid for transformers with lower than standard sound levels. Extensive improvements in manufacture and application of materials have created spectacular new performance available to all users of Westinghouse power transformers. Noise levels can now be reduced for much less cost.

Westinghouse power transformers—already smaller and lighter per kva than transformers of any other design or manufacture—will achieve lower sound levels and promise to show even greater advantage in weight and size comparisons. Here is new performance available for all new purchases of Westinghouse transformers—501 kva up to the world's highest capacity three-phase units.

So here's new help—especially in planning substations where increasing population densities are making transformer noise a real problem. This is welcome news, too, for noise-sensitive areas such as schools and hospitals. In addition to investment savings and improved public relations, consider the advantages of new flexibility in interchange of equipment, and new ease in obtaining rights of way and substation sites.

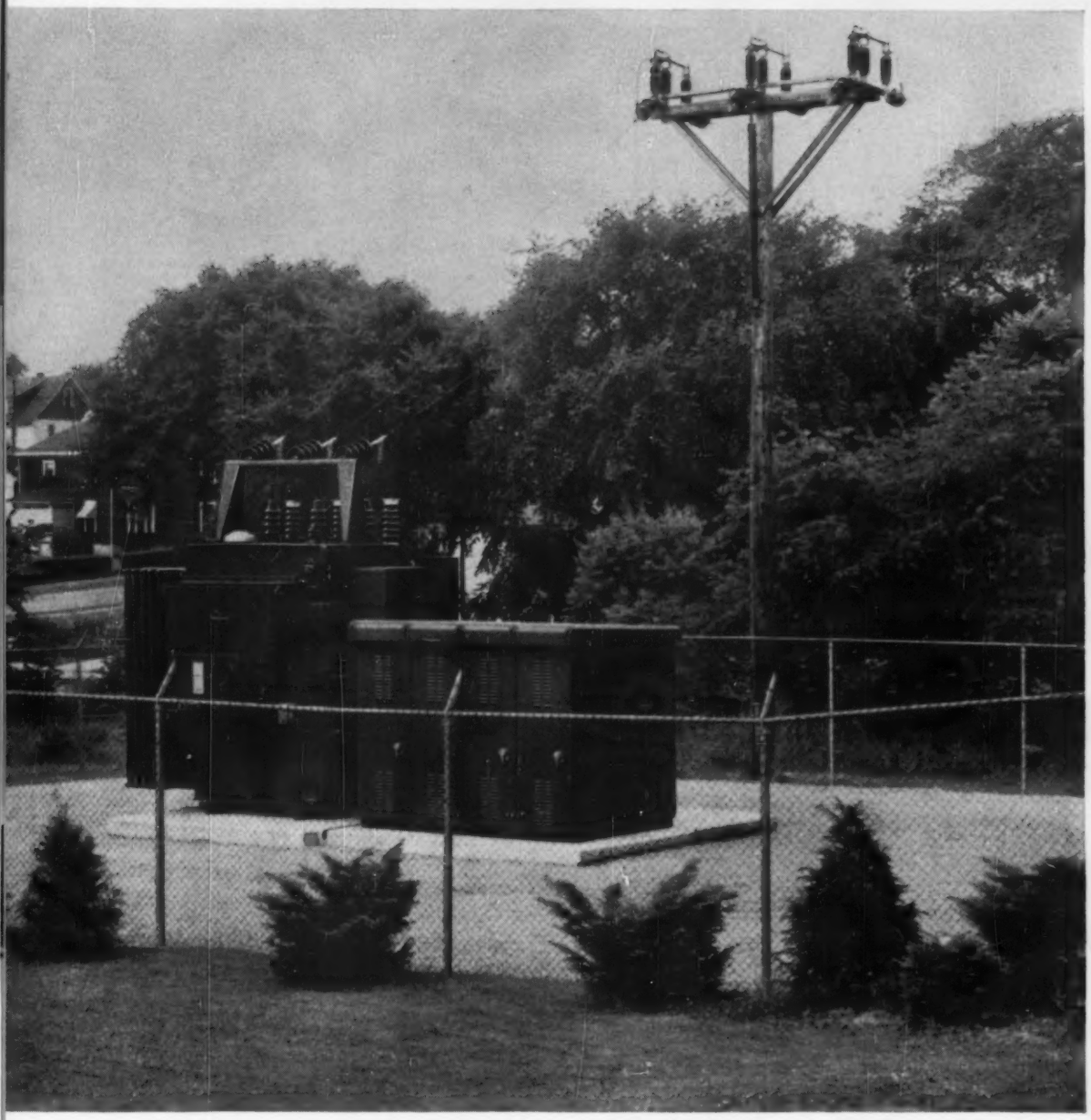
Anticipated power transformer purchases over the next five years total 300,000,000 kva. Based on this figure, reduction in soundproofing "extras" can reach $30,000,000. This is the performance Westinghouse can deliver—with all new power transformers.

For the full story, call your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-70785

Westinghouse now offers you a $11,730 saving on equipment ordinarily invested to cut transformer noise at a typical 10,000 kva neighborhood substation such as this . . . a saving equal to 25% of total equipment cost.

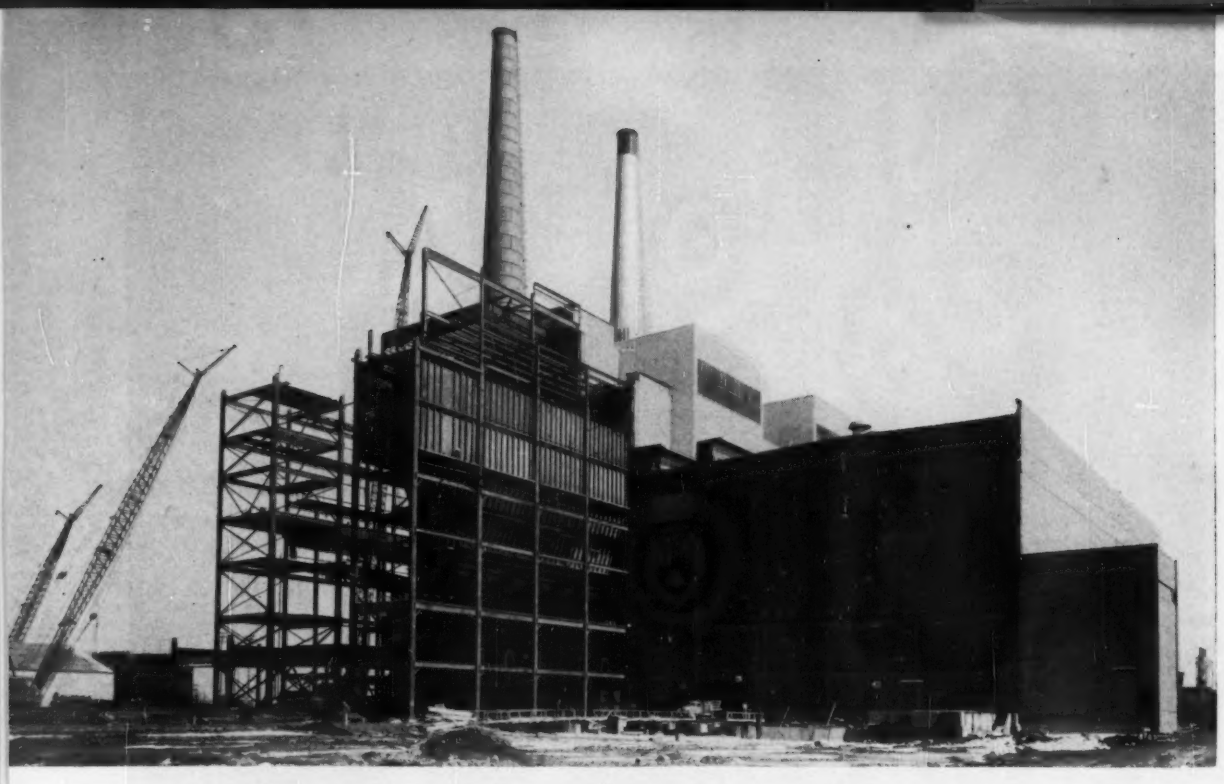
YOU CAN BE SURE...IF IT'S

Westinghouse®



RECOMMENDED NEMA SOUND LEVEL DB.	PER CENT PRICE ADDITIONS FOR REDUCTION IN RECOMMENDED NEMA SOUND LEVEL OF									
	3 DB.		6 DB.		9 DB.		12 DB.		15 DB.	
	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW
56 to 60	22	6	41	9	—	—	—	—	—	—
61 to 65	14	5	25	7	55	14	—	—	—	—
66 to 70	8	4	15	5	35	10	—	—	—	—
71 to 75	4.5	3	9	4	20	7	35	14	—	—
76 to 80	2.5	2	5.5	3	11	5	19	10	39	20
81 to 85	2	1	3.5	2	6	3	12	6	23	12
86 to 95	—	1	—	1	—	2	—	4	—	8

Drastic reductions in sound levels offered with all new Westinghouse Transformers make possible the above reduction in premiums previously necessary to achieve these same levels.



Low Heat Rate for 320-Mw Unit

GENERATION
Design

River Rouges No. 3's 8,620 Btu per kwhr heat rate is 260 Btu less than that for Units 1 and 2. Lower stack gas temperature and higher steam pressure are large factors

W. L. WINGERT, Asst Chief Mechanical Engineer, The Detroit Edison Co, Detroit, Mich.

Unit No. 3 at Detroit's River Rouge Plant, designed for 320-Mw capacity and a heat rate of 8,620 Btu per kwhr, is scheduled for operation in October 1957. It is the largest unit on the system and will bring the plant's gross guaranteed capability to 840 Mw.

Units 1 and 2 are of 260-Mw capacity each. The first went into operation last spring; the second is scheduled for operation this fall.

Here are some design features which make Unit 3's very attractive economy possible:

- Steam conditions of 2,450 psig, 1,050F main steam, and 1,000F reheat.
- Stack temperature of 206F at full load.

The unit will be of close-coupled cross-compound design. The steam generator will have a capacity of 2,000,000 lb/hr.

Principal departures from the design and construction features of Units 1 and 2 (EW, April 4, 1955, p 69) are:

1. Unit size was increased to 320 Mw, continuing policy of selecting the largest available design consistent with conservative system planning.

2. Throttle pressure was raised from 2,000 psig to 2,400 psig to improve station economy.

3. A close-coupled cross-compound turbine design was used. This design results in improved turbine plant arrangement. Friction losses are lowered by shorter cross-under pipes.

4. The 3,600-rpm generator is conductor cooled.

5. Last stage turbine blades were lengthened to 46 in. to reduce turbine leaving losses.

6. Stack gas temperature was lowered 70F to 200F by use of a series air heater arrangement. This increased boiler efficiency 1¾%.

7. Concrete stack 425 ft high with base at grade level gives better stack stability at lower cost. This will be Detroit Edison's first concrete stack.

8. Inlet louvers have been selected for induced-draft fan control. Evaluation of various fan types and control types proved that the forward curved multi-blade fan with louvers was the most economical.

Cost studies covered: size of units, plant steam conditions, cycle arrangement, last stage turbine blade length, design for stack gas temperature of 200F, and steam turbine drive for boiler feed pumps.

(*Continued on page* 43)

For general illumination, The Scott fixture by Sylvania provides soft, even light, has extremely high, 89.8%, illumination efficiency—giving a bonus in performance at no additional cost.

For close-work areas, mounting The Scott parallel to workers' line of vision brings maximum lengthwise shielding benefit into play. Lightweight plastic louver combines outstanding appearance with installation and maintenance features.

Supplementary lighting no longer needed...

Sylvania's Scott Fixture now provides precision lighting at Bendix Aviation

ENGINEERS WORKED OUT an unusual and successful lighting approach at the Eclipse Pioneer Division of Bendix Aviation Corp., Teterboro, New Jersey. In a semi-industrial area, they used a commercial-type fixture... Sylvania's *Scott* . . . to provide general illumination for precision motor assembly work.

Here The Scott does a double lighting job by eliminating the supplementary lighting system used previously:

1. **The Scott,** with its all-plastic reflector-shield, gives Bendix 110-116 footcandles of light at working level. It holds shadows and glares to a minimum, makes difficult seeing tasks easier.
2. **The Scott's** clean, attractive appearance harmonizes with the modern interior. Bendix personnel proudly show the installation to visitors as one more way Bendix protects the quality of its products.

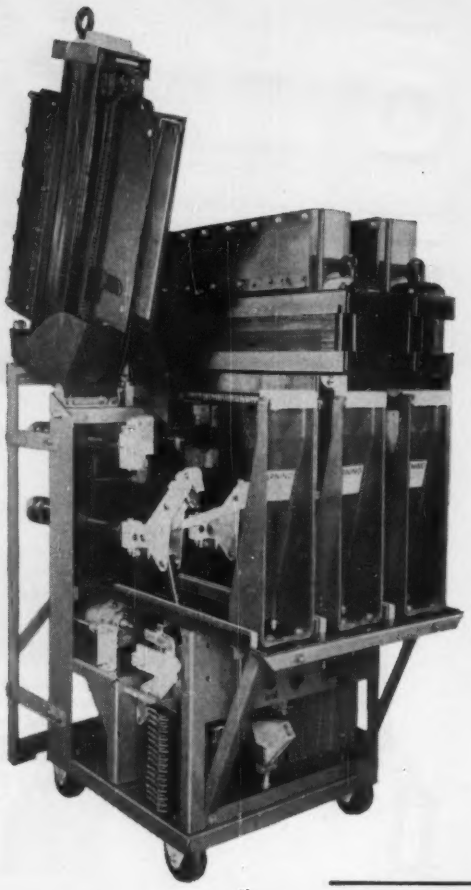
Sylvania's *Scott* fixture offers many economies in both industrial and commercial applications. Because it has an exceptionally high, 89.8%, efficiency, *The Scott* will, in many cases, give the desired illumination levels with fewer fixtures—along with quality lighting.

Next time you have an illumination problem either in industrial or commercial "close-work" areas, investigate the many advantages of lighting with Sylvania's *Scott*. For complete information, contact your local Sylvania Lighting Specialist, or write directly to:

SYLVANIA ELECTRIC PRODUCTS INC.
Department M-88,
Lighting Division—Fixtures
One 48th Street,
Wheeling, W. Va.

SYLVANIA
...fastest growing name in sight

LIGHTING • RADIO • TELEVISION • ELECTRONICS • ATOMIC ENERGY



A Complete Line of I-T-E Metal-Clad Circuit Breakers for Every Application

Anticipating the proposed addition of three new higher metal-clad switchgear ratings, I-T-E now has a complete line of circuit breakers which are fully developed and tested to meet every requirement.

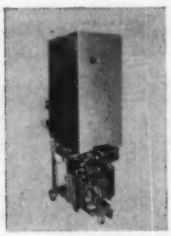
New 75 mva interrupting rating for I-T-E metal-clad switchgear applied on 4.16 kv systems

New 350 mva interrupting rating with a new 3000 amp continuous rating for application on 2.3 or 4.16 kv systems

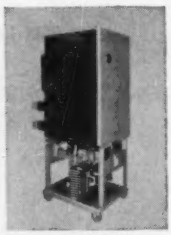
New 750 mva interrupting rating for application on 13.8 kv systems at 1200/2000 amp continuous

I-T-E Type	Continuous Amperes	Rated KV	Interrupting MVA
5HV-75	1200	4.16	75
5HV-150	600-1200-2000	4.16	150
5HV-250	1200-2000	4.16	250
5HV-350	1200-3000	4.16	350
7.5HV-250	1200-2000	7.2	250
7.5HV-500	1200-2000	7.2	500
15HV-150	600-1200	13.8	150
15HV-250	1200-2000	13.8	250
15HV-500	1200-2000	13.8	500
15HV-750	1200-2000	13.8	750

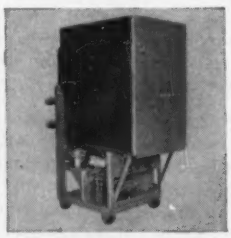
Note: These ratings require no change in I-T-E compartment dimensions.



5HV-75



5HV-350



15HV-750

For complete information, call your nearest I-T-E sales office. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Streets, Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY · **Switchgear Division**

Principal changes resulting from the studies were the increase in unit size, the increase in throttle pressure, the longer turbine blades, and the reduced stack temperature design. Little change in cycle arrangement could be justified, consequently Unit No. 1 and 2 arrangement will be repeated.

There will be seven stages of feedwater heating, five low-pressure and two high-pressure heaters. The high-pressure heaters are each half size parallel-flow units. Final feedwater temperature will be 474F. Three half-size boiler feed pumps will be motor driven through variable speed couplings.

The changes in design, incorporated as a result of the studies, are expected to reduce the net plant heat rate for No. 3 unit to about 8,620 Btu per kwhr, some 260 Btu lower than the heat rate for the first two units.

The turbine-generator is rated 320 Mw at one in. Hg back pressure. The close-coupled cross-compound arrangement used is advantageous from the standpoint of space requirement and equipment and piping arrangement.

River Rouge No. 3 unit has the high-pressure and double-flow-reheat turbines in tandem on the 3,600 rpm shaft and the double-flow low-pressure turbine on the 1,800 rpm shaft. The last stage wheels are in the center of the turbine. The 46 in. last stage buckets, the longest blades ever used, are easily justified in view of the low condensing water temperatures in the Detroit River.

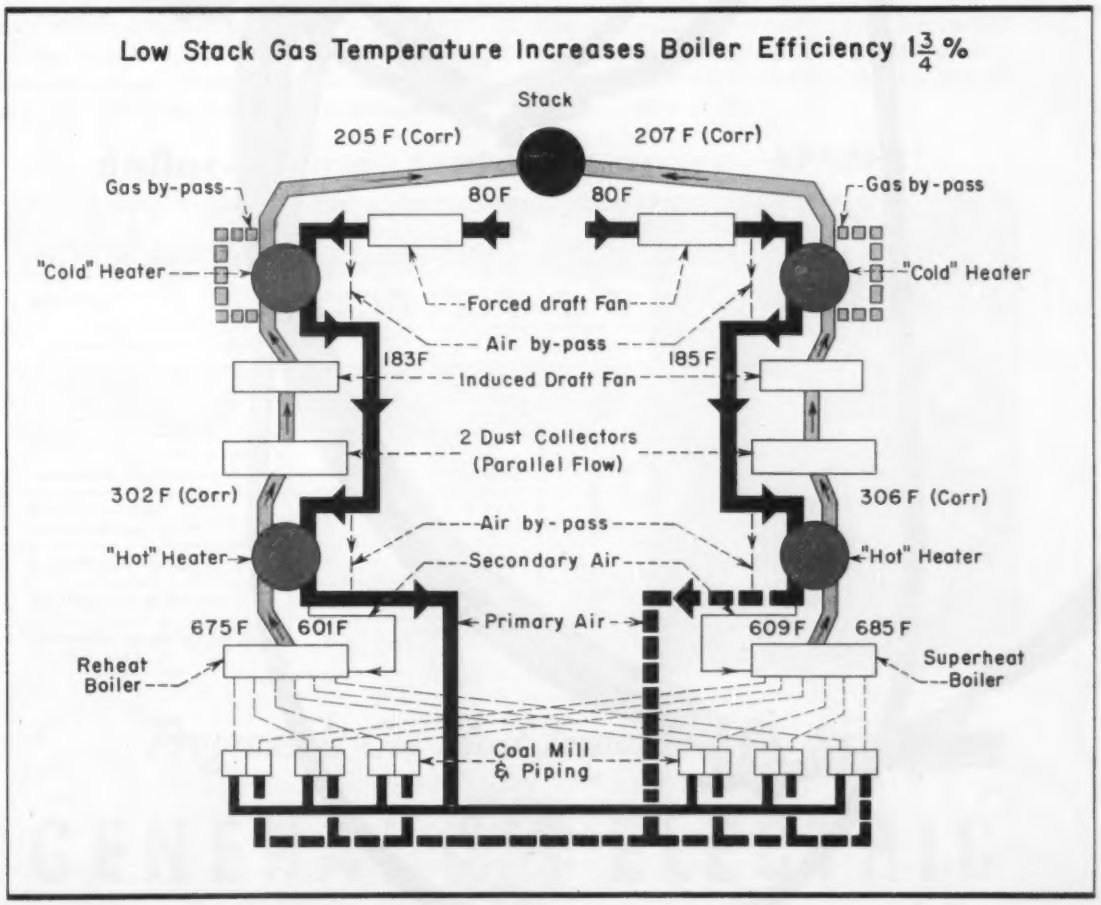
High-pressure throttle conditions will be 2,400 psig and 1,050F. Reheat steam pressure design is 462 psig and 1,000F. Cross-under from the reheat turbine to the low-pressure turbine will be 100 psig, 656F. The load split at 322 Mw output is 179 Mw on the high-pressure shaft and 143 Mw on the low-pressure shaft. This will be the largest 3,600 rpm generator in the Detroit Edison system.

The condenser will be of the single-pass type with its axis parallel to the axis of the low-pressure turbine. The 21,800 ¾-in. 18 BWG Admiralty tubes will be 40 ft long, giving a total of 170,000 sq ft of surface. Condensing water will be furnished by two 80,000-gpm vertical pumps located at the condenser.

No. 3 steam-generator is a natural circulation unit and will operate at 2,450 psig at the superheater outlet. The unit is arranged as two completely separate steam generators. One steam generator is referred to as the superheat boiler, the other as the reheat boiler. Each has its own independent boiler water circuit including economizer,

(*Continued on page* 47)

IMPROVEMENT in boiler efficiency justifies increase in first cost due to series heater arrangement. Washing is expected to keep heaters commercially clean. Bypass circuits are provided for removal of either "cold" heater from service



DISTRIBUTION TRANSFORMERS

THESE BRACELETS

COULD SAVE YOU...$210

Estimate your possible savings in terms of all transformers on your lines

Sometimes an ordinary transformer cover warps from uneven pressure because of careless tightening of clamps or bolts. If the cover has the usual cork or cork-and-rubber gasket, air can leak in. In one recent case-history moisture accumulated in the tank in less than a year, causing a short circuit between tank and windings. The failure cost $210 for the service trip and replacement of the 5-kva, 2400-volt unit.

G-E cover design prevents this problem. The one-piece stainless-steel clamping band and Nitrile rubber gasket on a G-E transformer maintain a tight seal for the life of the transformer. The band is tightened with only one bolt—pressure is thus uniform around the rim. The gasket resists air and oil, and continues to exert "back" pressure against rim and cover. Similar one-piece stainless-steel bands and Nitrile gaskets are used for bushings and hand hole covers. Factory sealing is thus maintained permanently.

Gaskets and bands are easy to remove. The Nitrile gaskets, furthermore, require no cement and can be used over and over again.

Look at the other money-saving features that prove "All Transformers Are Not Alike": **Impulse testing,** for instance, saves years of transformer life. **AL/CU terminals** are designed to prevent both copper and aluminum conductors from loosening. **Strenicor terminal clamps** save terminals from breaking. **Super Melaglyp paint** saves up to two repaintings. **Nationwide warehouses** save utilities heavy inventory expense. **Service shops** can cut your repair and rebuilding costs.

For the complete story, contact your nearest G-E Apparatus Sales Office or G-E Agent—or write to General Electric Company, Section 431-35, Schenectady 5, N. Y.

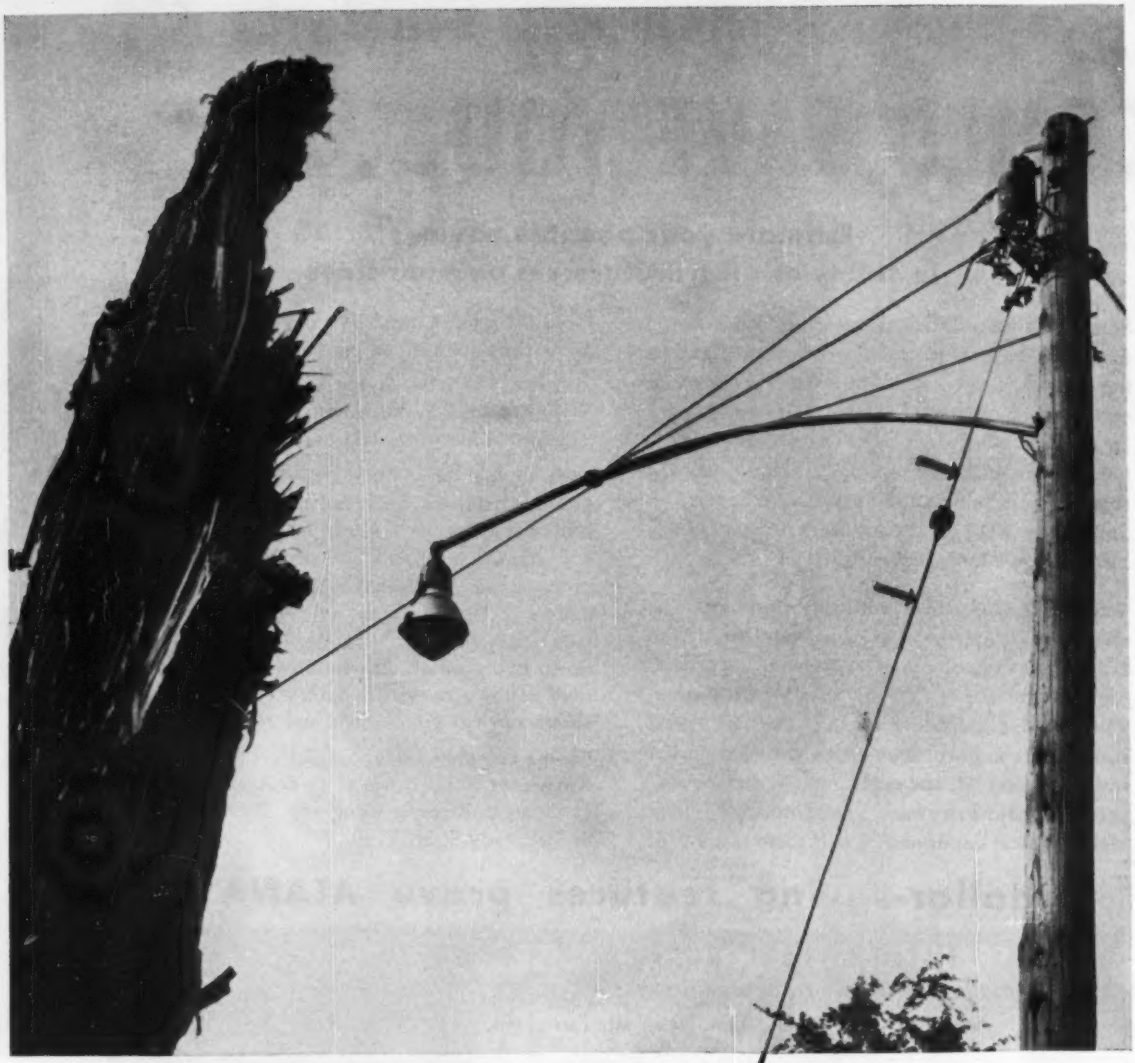
dollar-saving features prove ATANA*

***ALL TRANSFORMERS ARE NOT ALIKE**
(make this simple comparison and see)

FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	√			√		√
Nitrile rubber gaskets	√					√
One-piece clamping band	√					
H-v and l-v terminals handle both copper and aluminum conductors	√					
Strenicor pressure terminal clamps	√					
Super Melaglyp paint	√					
More than 100 warehouses	√	√				
Nationwide, company-operated service shops	√	√				

Progress Is Our Most Important Product

GENERAL ELECTRIC



75 - 100 MPH Wind Rips off Tree

PLP *GUY-GRIP* Dead-Ends Stand Firm

Nature provided the test. Hurricane-strength winds—75-100 miles an hour—snapped off the top half of a huge elm tree ... and hurled it against both pole and guy. After the debris was removed... the picture told it's own dramatic story. Here's graphic evidence that today's best answer to any guying problem... subjected to any kind of condition... is PLP Guy-Grip dead-ends.

Made in accordance with or for use under U. S. Patent No. 2,761,273; other patents pending.

PX – 77

PREFORMED LINE PRODUCTS COMPANY

5349A St. Clair Avenue — Cleveland 3, Ohio

TELEPHONE: CLEVELAND EXPRESS 1-3571

drum, and drum-level controls, and each has its own radiant primary superheater.

Steam from both primary superheaters is raised to final temperature in a drainable secondary superheater which is located in the superheat boiler. The steam reheating surface is located in the reheat boiler.

Because the steam production from both boilers is superheated in one unit and all reheating is done in the other, the boilers cannot be operated independently. Firing of the reheat furnace is controlled to maintain reheat steam temperature. Firing of the superheat furnace is controlled to maintain steam output. Superheat steam temperature is controlled by condenser-type desuperheaters which reduce the temperature at each primary superheater outlet as required to accomplish control of final steam temperature.

The combustion-gas-and-air circuit for each boiler is independent of the other. Each boiler has its own air heaters, dust collectors, induced-draft fan and forced draft fan. The six duplex coal mills, coal piping, and primary air supply are similarly separated. The duplex is essentially two mills on one shaft. One is piped to each furnace so that a mill outage affects each boiler equally.

Complete segregation of the combustion-gas, air, and fuel circuits of one boiler from the other results in very simple control features. Draft and combustion equipment of each functions on the basis of the need of its own associated part of the unit.

Boiler Efficiency Improved by 1¾%

Full load stack gas temperature will be reduced to 206F by a series air heater arrangement. The heaters are of the rotating type. Air heating surface in this arrangement is divided into two parts. The first section is known as the "hot" heater. It is located ahead of the dust collector. The remainder is known as the "cold" heater.

The split is necessary because full reduction of temperature ahead of or following the dust collector is impractical because of collector operating conditions in the first case and collector size in the latter case. Operation of an air heater at abnormally low temperature downstream of the dust collector, with the normal 3% sulphur coal, was considered feasible as it was believed that corrosion and fouling would be minimized by removal of the major portion of the solids in a high efficiency collector.

The series heater arrangement gives a boiler efficiency improvement in the range of 1¾%. This saving represents a good return on the increased first cost. Considerations other than cost which appear favorable are:

1. Design is a progressive step in improving boiler-plant economy for this and future plants.

2. Continuity of service for the steam generator should be improved because the hot heater will operate at a temperature conducive to trouble-free operation and the cold heater can be removed without affecting capability.

3. Dust collectors will operate at a temperature which should minimize corrosion and dust removal problems.

Items 2 and 3 are accomplished by careful attention to heater sizing and duct arrangement. The hot heater is sized for a 300F full-load corrected gas-exit temperature. The temperature at half-load is 275F. This range of operating temperatures should bring a minimum of dust-collector problems.

A cold-end average plate temperature minimum of 230F is maintained at loads below full load by bypassing combustion air around the heater. When the cold-air preheaters are out of service, resulting in colder air to the hot heaters, a much higher per cent of the air must be bypassed. During this period, considering economy and the expectation of low cold-heater outage time, hot-heater cold-end temperature is permitted to drop to 215F.

Previous designs have been based on a 190F cold-end average temperature. This has been very much on the borderline, considering fuel supply, and has created some fouling problems. In actual practice some installations operate at plate temperatures up to 220F to avoid this trouble. In such cases there is some sacrifice in efficiency. The approach in this design has been to start out with conservative conditions and as experience indicates reduce the end temperature at partial loads by reducing bypassing with resulting improvement in efficiency.

Bypassing the hot heater has the effect of decreasing the combustion air temperature. This could cause difficult milling conditions during wet coal periods, particularly when the cold heaters are bypassed. For this reason the primary-air supply ducts are independent of the secondary-air ducts. Bypassed air acts to temper the secondary air only so that mill performance is not adversely affected.

Each cold heater is located between the ID fan and the stack. This serves two functions. First, the differential across heater seals is reduced by the head developed by the fan, and second, this location reduces to an absolute minimum the amount of equipment subjected to corrosive gases. The penalty for this arrangement is the power cost and fan size for handling hotter gas.

The cold heater will be an inverted heater. This is essential although it results in more complex ductwork. It is important that any condensation which forms at the cold end drain out of the heater rather than back into the hotter portion of the heater. The same principle applies for soot-blowing and heater washing operations.

Full-sized cold-heater bypasses are provided for both gas and air. These ducts and dampers permit removal of either or both heaters from service without interfering with unit capability. Removal of the heaters from service will permit washing as often as necessary. A washing system will be provided so that washing with alkaline wash water will be simple operating procedure.

A pilot plant test unit consisting of an actual size 7 air preheater was put in service at Conners Creek Station in February 1955. Operation of this heater closely parallel expected operation of the Rouge cold heaters.

In-Service Washing Will Keep Heaters Clean

Over a year's operation of this unit shows that low temperature operation is entirely feasible. Surface fouling will not be a problem. Air soot blowing supplemented by in-service washing once every two to four weeks will keep the heaters commercially clean.

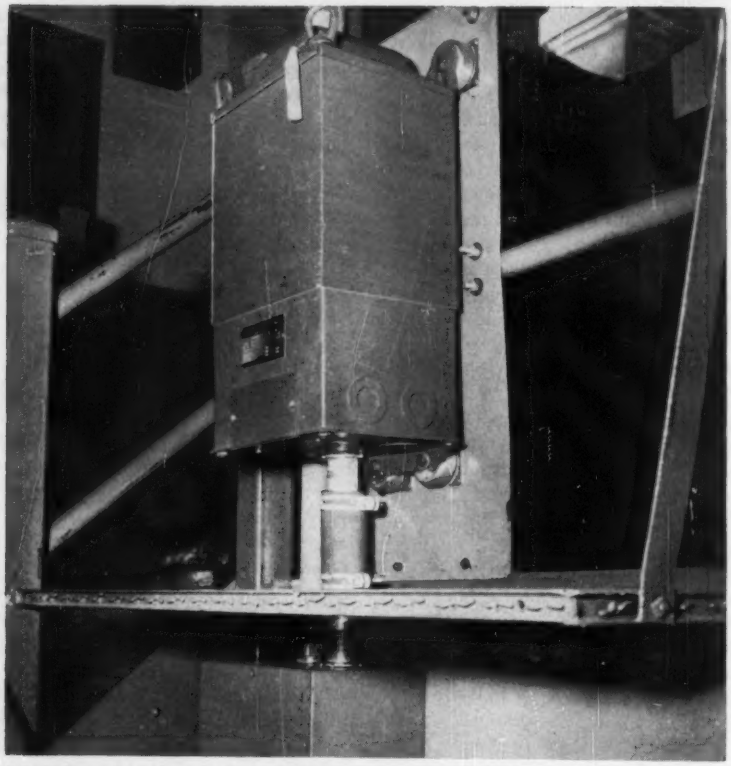
From the standpoint of corrosion, Corten steel cold-heater hot-end elements should last upwards of five years. The cold-end baskets will be enameled, and it is predicted their life will exceed that of the hot-end units.

A 98% collection efficiency is predicted for the four combination mechanical-electrostatic dust collectors which are located between the hot heaters and the induced draft fan. Two parallel flow units serve each boiler. Dust will be removed from the collector hoppers by a pneumatic system and discharged to a dry ash storage silo. Mechanical blowers are being used to produce the system vacuum.

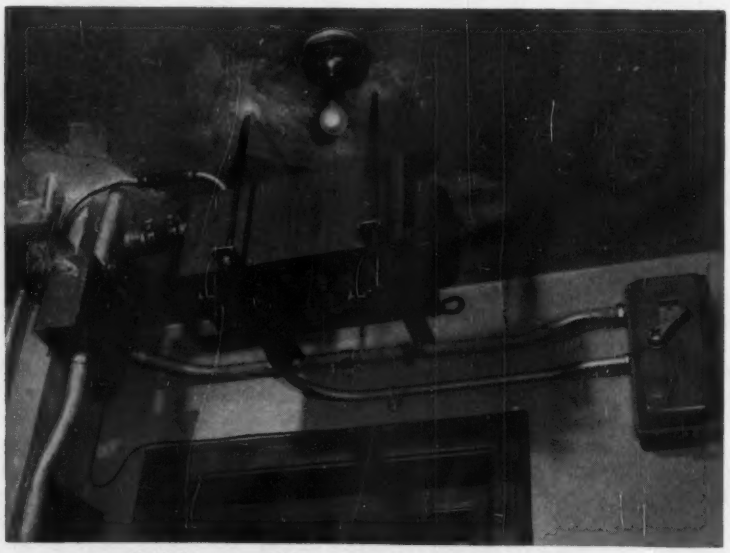
Big Apartment Buildings Convert

New voltage increases wiring capacity, costs less than increasing conductor size, seen booming appliance sales

F. R. McSHANE, Power Service Engineer,
JOHN A. HUGHES, Distribution Engineer,
Commonwealth Edison Co, Chicago, Ill.



25-Kva dry-type transformers on service stairs . . .



or suspended from ceiling over elevator doors . . .

Changing the service entrance and risers from conventional 120/240 to 460 v solved the wiring problems of several Chicago apartment buildings.

In this changeover, although the source transformers are standard 277/480-v units, their nominal operating voltage is 265/460, with secondary neutral grounded. This increases the wiring capacity 361%.

In making this conversion, the cost to the builder averages about $250 per apartment. Obtaining the same capacity increase by installing larger conductors for conventional 120/240-v service would have cost 2½ times as much.

To be economical, however, a 460-v system needs these basic requirements:

1. The building must have 100 or more apartments and should be ten stories tall.

2. The riser system must have sufficient capacity for modern requirements at 460 v.

3. Suitable sites must be available in the building for the dry-type, step-down transformers.

When the building satisfies these conditions, to raise the voltage:

1. The service entrance is converted to 460 v, 3 phase.

2. The risers are converted to 460 v.

3. At selected points, 460/120-240-v dry-type transformers are installed to step down the voltage to conventional 120/240 v for service to the apartments.

Risers are connected 460 v, 3 wire, and the neutral wire is not carried. In this way, the three existing conductors at 120/240 v can be used for the 460-v system.

The dry-type transformers, generally, are of 25-kva capacity and 1x1x2 ft in size. These can be mounted on the ceilings over elevator doors, attached to walls, or suspended from railings of service stairways. One or two are installed at each location where they may serve one, two, or three floors, depending on the number of apartments per floor, the load per apartment, and the wiring.

Meters are centered on various floors. The decision to provide a

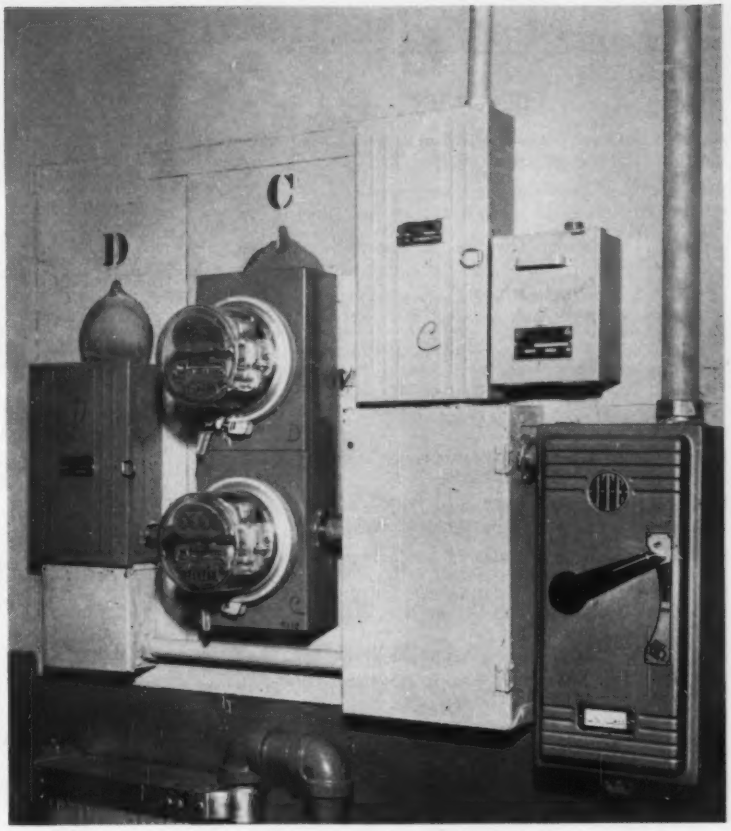
To 460 V

3-wire 120/240 rather than 120/208-v service for each apartment was based primarily on the substantial savings in costs. The 120/240-v single-element meters cost $19.40 less per meter than the 120-208-v two-element ones.

As the number of meters for each building is large, savings are significant. Advantages of 240-v over 208-v service for ranges, water heaters, and other large appliances were also recognized factors favoring 240 v.

Five Chicago apartment buildings have been converted. A 460-v distribution system is used in a new apartment building and will be used in three apartment buildings now under construction. Similar systems are in the negotiation stage for three new buildings and for 15 conversions.

Interest in 460 v for apartment building risers, now strong, is rapidly strengthening. The story of the advantages of this voltage has been presented to owner and operator groups. Moreover, increased capacity of apartment building wiring opens the door to the sale of major appliances.



feed floor service and meter centers in . . .

10-or-more-story apartment buildings, served at 460 instead of 120/240 v

MEETINGS CALENDAR

DECEMBER

Electric Companies Public Information Program—Steering Committee, Biltmore Hotel, New York City, Dec. 5.

Electrical World—Electrical Space Heating and Heat Pump Conference, Barbizon-Plaza Hotel, New York City, Dec. 5-6.

Institute of Radio Engineers—2nd Instrumentation Conference, Biltmore Hotel, Atlanta, Ga., Dec. 5-7.

Edison Electric Institute—1957 Conference Planning Committee, sponsored jointly with American Gas Association, EEI-AGA Headquarters, New York, Dec. 6-7; Street Lighting Committee, Dayton, Ohio, Dec. 6-7; Commercial Cooking & Water Heating Committee, Cleveland, Ohio, Dec. 13-14.

JANUARY, 1957

Northeastern Weed Control Conference — Sheraton - McAlpin Hotel, New York City, Jan. 10-12.

Doble Engineering Co—24th Annual Conference of Doble Clients, Sheraton-Plaza Hotel, Boston, January 14-18.

Edison Electric Institute—Industrial Relations Committee, sponsored jointly by personnel section of Southeastern Electric Exchange, Sheraton Park Hotel, Washington, D. C., Jan. 17-18; Industrial Power & Heating Group, New Orleans, La., Jan. 17-18.

Southeastern Electric Exchange—Personal Administration Section Meeting, held jointly with EEI, Sheraton-Park Hotel, Washington, D. C., Jan. 17-19.

American Institute of Electrical Engineers—Winter General Meeting, Hotel Statler, New York, Jan. 21-25.

American Welding Society—Illinois Institute of Technology—3rd Annual Midwest Welding Conference, Illinois Tech Chemistry Bldg., Chicago, Ill., Jan. 30-31.

Missouri Valley Electric Association—Industrial & Commercial Sales Conference, Hotel President, Kansas City, Mo., Jan. 31-Feb. 1.

FEBRUARY

National Association of Purchasing Agents—26th Annual Mid-Winter Conference, Public Utility Buyers' Group, Brown Hotel, Louisville, Ky., February 3-5.

Edison Electric Institute—Prime Movers Committee, Deschler Hilton Hotel, Columbus, Ohio, Feb. 4-6; Transmission & Distribution Committee, Netherland Plaza Hotel, Cincinnati, Ohio, Feb. 7-8; Electrical System & Equipment Committee, Somerset Hotel, Boston, Mass. Feb. 7-8.

National Electrical Week—Second Annual Observance, Feb. 10-16.

Electric Institute of Washington—Electrical Trade Conference & Exposition, Shoreham Hotel, Washington, D. C., Feb. 12-14.

American Institute of Electrical Engineers—1957 Transistor & Solid State Circuit Conference, sponsored jointly with Institute of Radio Engineers and University of Pennsylvania, University of Pennsylvania, Philadelphia, Pennsylvania, February 14-15.

National Society of Professional Engineers—Spring Meeting, Hotel Francis Marion, Charleston, S. C., Feb. 15-16.

13th Annual National Adequate Wiring Conference—Sherman Hotel, Chicago, Ill., Feb. 21-22.

American Society of Heating and Air-Conditioning Engineers—63rd Annual Meeting, Chicago, Ill., Feb. 25-28.

Pacific Coast Electrical Association—Business Development Section, Sheraton-Palace Hotel, San Francisco, Calif., Feb. 28-Mar. 1.

MARCH

Southern Safety Conference—John Marshall Hotel, Richmond, Va., Mar. 3-5.

Louisiana State University—Annual Conference on High-Speed Computers, Baton Rouge, La., Mar. 5-8.

Northwest Electric Light & Power Association—Business Development Section, Empress Hotel, Victoria, B. C., Mar. 18-20.

Edison Electric Institute—Industrial Relations Committee, EEI Headquarters, New York City, Mar. 21.

Pacific Coast Electrical Association—Engineering & Operating Section, Hotel Statler, Los Angeles, Mar. 21-22.

Oklahoma Utilities Association—Biltmore Hotel, Oklahoma City, Okla., Mar. 27-28.

Illinois Institute of Technology—19th Annual American Power Conference, Hotel Sherman, Chicago, Ill., Mar. 27-29.

Evans to Speak at Space Heating Meet

Vast load and revenue opportunities in electric heating and cooling will be outlined by Utility Chief Gordon W. Evans at Electric World's Electric Space Heating and Heat Pump Conference which opens Wednesday in New York.

Evans, board chairman and president of Kansas Gas & Electric Co, will join some 24 other industry executives who will appear on the two-day program. Conference sessions are slated for Dec. 5 in the Barbizon-Plaza Hotel and Dec. 6 in the Plaza Hotel. More than 150 sales and rate people from electric light and power companies are expected to attend the conference.

GORDON W. EVANS

Toledo Ed Starts Addition

Toledo Edison Co has started construction work on a $22-million power plant expansion of Bay Shore Station to meet the expected 50% increase in northwestern Ohio's power demands by 1960. The station will house a new 135,000-kw turbo-generator to be in operation in 1958.

Plant McManus to Expand

Addition of a 75-Mw generating unit to burn either coal or oil, is planned for Georgia Power Co's Plant McManus for mid-1959 operation. Coal burning facilities will be added to the existing 40-Mw unit which presently burns oil exclusively.

ANOTHER REASON WHY UTILITIES EXPECT MORE FROM

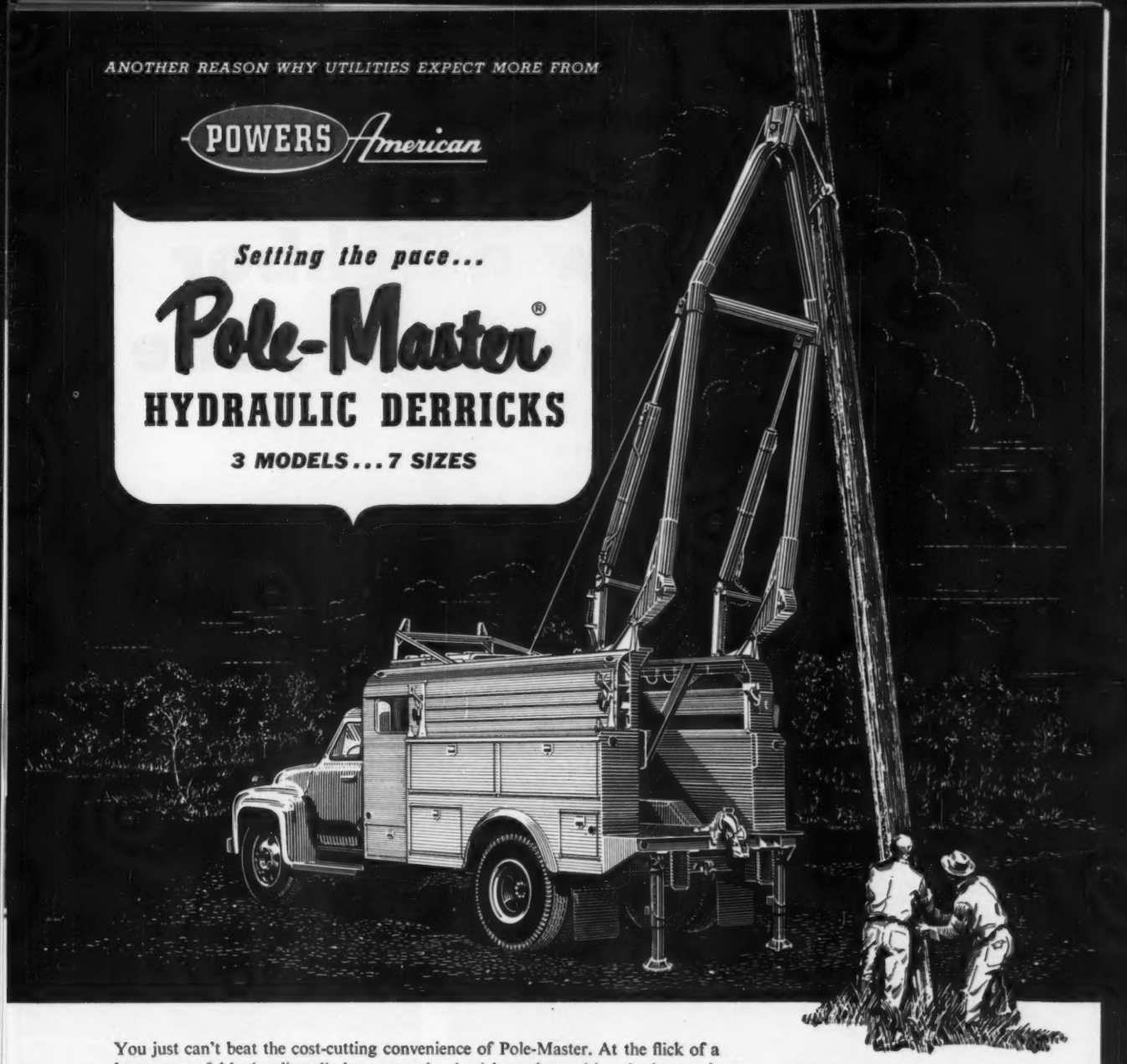
POWERS *American*

Setting the pace...

Pole-Master®

HYDRAULIC DERRICKS

3 MODELS... 7 SIZES



You just can't beat the cost-cutting convenience of Pole-Master. At the flick of a lever, powerful hydraulic cylinders move the derrick to the position that's *exactly* right for the hoisting job. There's no exposed mechanism. Head sheave can be threaded from the ground.

When it comes to capacity, Pole-Master equals or surpasses conventional derricks of comparable rating. It stows *above* the body... never obstructs valuable cargo area space.

Aren't these the features you've long wanted in a derrick for your job?

The powerful Series PM-2 Pole-Master, shown above on a Powers-American Series 800-C Line Body, is available in sizes for handling 40′, 55′, and 70′ poles.

DESCRIPTIVE LITERATURE ...plus complete price information IS YOURS FOR THE ASKING!

McCABE-POWERS AUTO BODY COMPANY

5900 NO. BROADWAY • ST. LOUIS 15, MO.

625 CEDAR ST. • BERKELEY 10, CALIF.

Series HD-2 Pole-Master Derricks can be furnished in sizes for handling 40′ and 55′ poles.

The Series HD-4 Pole-Master, actuated by four hydraulic cylinders, handles 55′ and 70′ poles.

Powers-American conventional derricks, tripod or T-type, are available in all sizes and capacities.

An example of Allis-Chalmers leadership

This new neighbor won't bother anyone

New low-sound-level 125,000-kva transformer built by Allis-Chalmers for Wisconsin Electric Power Company bulk station in residential area.

Even residents of homes only 300 feet away will have no reason to complain about this good neighbor. It was specially designed to create good will.

Because of the location, Wisconsin Electric Power Company required a transformer with a low noise level.

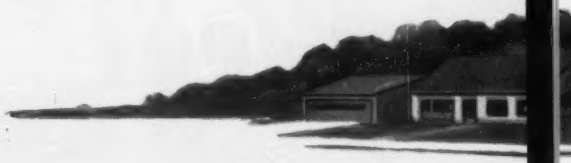
After careful study of the area, Allis-Chalmers designed and built a unit with frequencies melded to the ambient.

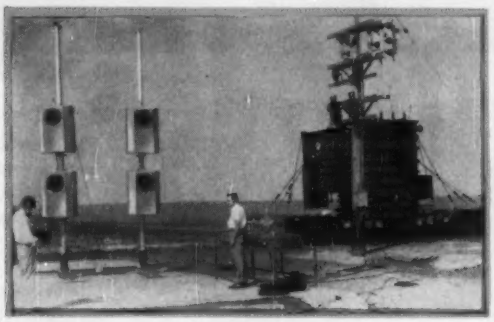
In addition, tests show that such factors as temperature rise, auxiliary losses and operating efficiency are extremely favorable.

This installation is assurance that, where low noise level is important, you can look to Allis-Chalmers.

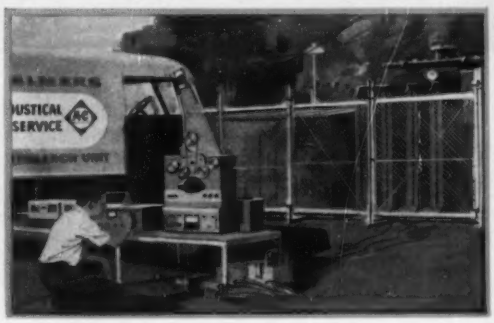
Transformers like this are an outgrowth of continued research by Allis-Chalmers into magnetostriction and resonance in the A-C Sound Laboratories, the Mobile Research Unit and the Acoustical Proving Ground.

For help in finding the best and most economical means for solving a sound problem, contact your nearby A-C office. Or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.





Ten-acre acoustical proving ground provides first *practical* means for sound-level testing. Equipment on hand includes means for duplication of any area acoustically.



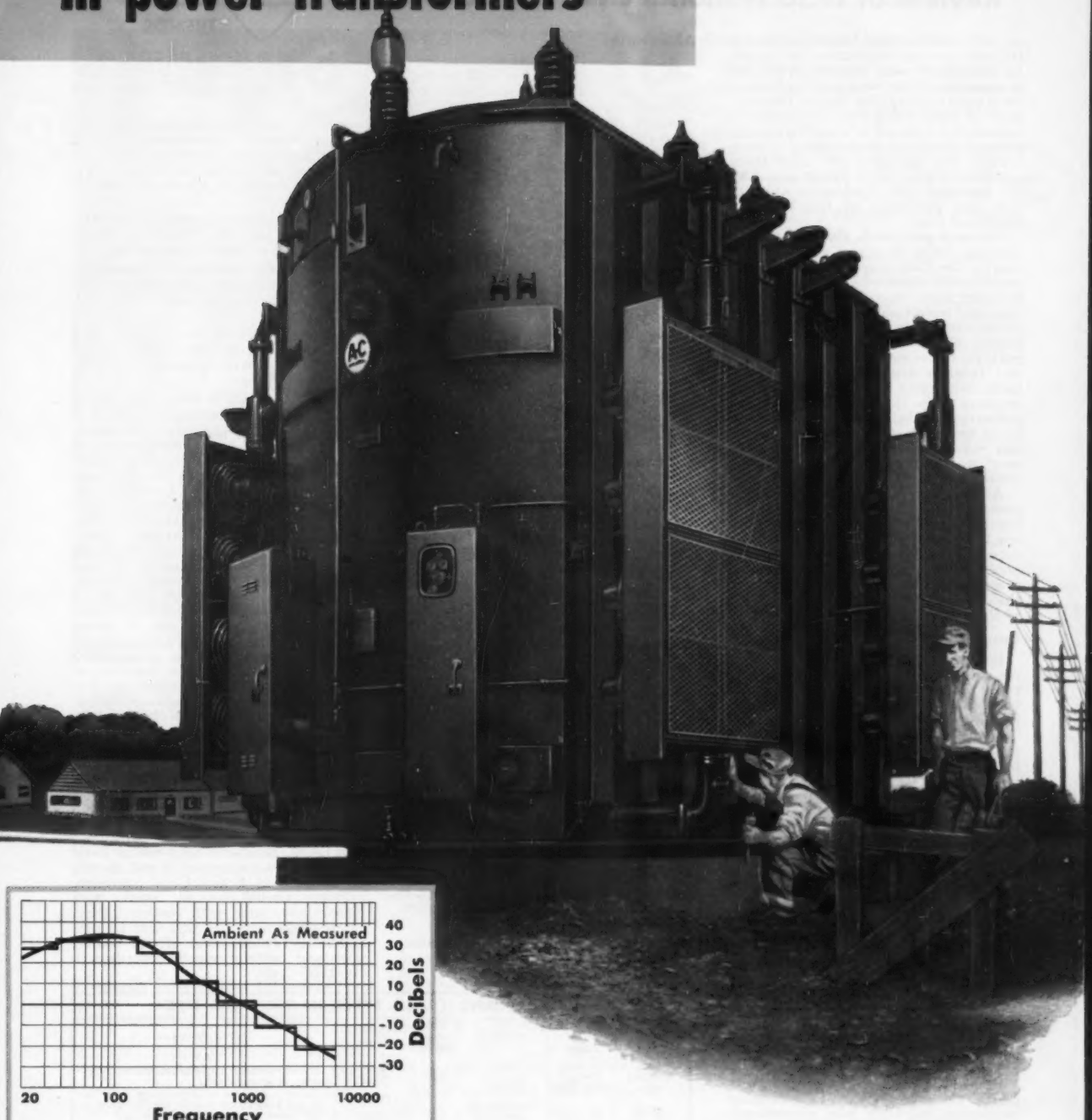
Mobile sound research laboratory unit can bring laboratory equipment to where substations are planned . . . helps you decide sound level of transformer.

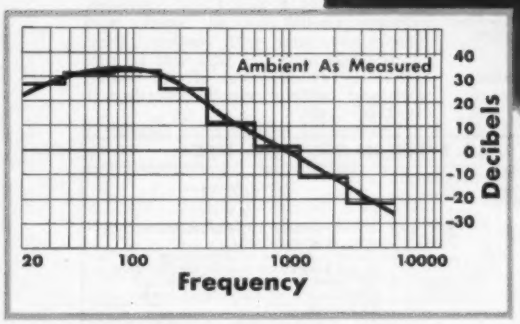
A-C ALLIS-CHALMERS

A-5225

ALLIS-

in power transformers





Testing at 2:00 a.m. determined maximum masking noises . . . helped determine noise level which transformer could have without creating complaints from nearby residences.

Low sound level is feature of new 125,000-kva Allis-Chalmers transformer being installed in residential area.

CHALMERS

ADVERTISEMENT

Review of 1956 National Electrical Code

CURRENT TRENDS

No. 9 in a series of articles

In 1897, the first regulations governing the safe use and installation of electrical equipment were adopted under the sponsorship of the National Conference on Standard Electrical Rules. The purpose of these rules was, of course, to reduce the loss of life and property through the improper handling of electricity. For the past 45 years these regulations have been promulgated by the National Fire Protective Association and published as the National Electrical Code.

To keep pace with the rapidly expanding, ever-changing electrical industry, the Code must, of necessity, be periodically reviewed and revised to reflect the very latest in equipment design and installation practices. This is accomplished by a continual reappraisal of the Code requirements and periodic revisions issued in the form of an "Interim Amendment" or a complete reissuance of the Code. As a measure of its stature in the electrical industry, the Code is regularly adopted as an American standard by the American Standards Association and is the *one* standard generally accepted throughout the United States.

Although the work of the Utility Engineer is generally beyond the scope of the National Electrical Code, a working knowledge of its provisions can be extremely helpful and is, sometimes, necessary. Accordingly, a review of some of the more significant changes that will appear in the new 1956 edition of the Code may be helpful.

Conductors:

Some new wire and cable types are recognized in the 1956 National Electrical Code. Of the three new types to be added, it is expected that considerable interest will be centered around new Type RHH. RHH is a general-purpose, 600-volt building wire designed for use in dry locations at temperatures of up to 90°C. Other than the high temperature insulating compound, the construction and general appearance of this product will be similar to a conventional RH-RW wire having either an outer braid or Neoprene sheath. RHH should be useful in high ambient locations or for feeders, services, etc., in sizes where voltage drop is not a serious factor.

The approved size range for Type UF (Underground Feeder and Branch Circuit Cable) is being extended from 14 AWG through 4 AWG to 14 AWG through 4/0 AWG. This will permit Type UF to be used for larger feeder circuits—especially useful in commercial or industrial applications.

Services:

Recognizing the phenomenal growth in the use of electricity in individual residences, the Code now recommends a minimum 100-ampere, 3-wire service be provided in line with the "Adequate Wiring" and "Housepower" programs.

Temporary Wiring:

Because nearly all building contractors now require temporary electrical service to supply power tools, a new section has been added to cover these circuits. This section requires, in part, that there shall be a suitable switch or plug connector to disconnect *all* conductors of a temporary circuit by a single operation and that no bare conductors nor earth returns shall be used.

Aluminum:

As the use of aluminum becomes more prominent for electrical conductors, it gains greater recognition in the Code. Previously the current-carrying capacity (ampacity) of aluminum conductors has been established at 84% of that of copper. This has resulted in a general use of an aluminum conductor numerically two AWG sizes smaller than copper to obtain equivalent ampacity. As a result of an extensive industry study, the Code will contain new, complete aluminum ampacity tables 1A and 2A which will be based on a value ranging from 78% to 84% of copper, depending on the conductor size involved, such as 78% for size 12 AWG and 84% for 2000 MCM. In addition, the Code will provide for special current-carrying capacities for types RH, RH-RW, RHW and RHH aluminum conductors of a 3-wire single-phase service and sub-service as follows:

No. 2 AWG 100 amps.	No. 2/0 AWG 150 amps.
No. 1 AWG 110 amps.	No. 3/0 AWG 170 amps.
No. 1/0 AWG 125 amps.	No. 4/0 AWG 200 amps.

The preceding special ratings apply, as indicated, for services and sub-services where considerable experience has indicated that through diversity of load these ratings are justified. For all other applications, the ratings in the Code tables which are approximately 10% lower shall apply.

Definitions:

To provide a uniform interpretation of Code provisions, the section on definitions plays an important part. New definitions being added this year are:

Branch Circuit—Appliance: An appliance branch circuit is a circuit supplying energy to one or more outlets to which appliances are to be connected; such circuits to have no permanently connected lighting fixtures not a part of an appliance.

Branch Circuit—General Purpose: A branch circuit that supplies a number of outlets for lighting and appliances.

Branch Circuit—Individual: A branch circuit that supplies only one utilization equipment.

Conductor: Bare: A bare conductor is one having no covering or insulation whatsoever.

Conductor: Covered: A covered conductor is one having one or more layers of non-conducting materials that are not recognized as insulation under the Code.

Ground: A ground is a conducting connection, whether intentional or accidental, between an electrical circuit or equipment and earth, or to some conducting body which serves in place of the earth.

Grounded: Grounded means connected to earth or to some conducting body which serves in place of the earth.

Grounded Conductor: A conductor which is intentionally grounded, either solidly or through a current-limiting device.

Grounding Conductor: A conductor used to connect an equipment, device, or wiring system with a grounding electrode or electrodes.

Identified: As used in this Code, means the conductor or terminal to which it refers is to be recognized as grounded.

The foregoing represents a review of but a few of the 180 changes or additions that will appear in the 1956 National Electrical Code. Complete information regarding these revisions can be found in the "Analysis of 1956 Revision of National Electrical Code" published by the National Electrical Manufacturers Association. If you would like a copy of this helpful booklet, write to Department 109, Rome Cable Corporation, Rome, New York.

Even as the 1956 Code is being printed, further changes and improvements are under study in preparation for the next publication of the Code or additional interim amendments. For example, an important public contribution is being made by the electrical industry through a study conducted by them to determine the maximum number of conductors that can safely be installed in raceways, as well as the appropriate current-carrying capacity of each individual wire when more than nine are installed in a conduit or other raceway. The results of this study are now being considered by a special Code committee. It is expected, it will shortly be adopted as a new Code provision.

Rome Cable has, as usual, been closely associated with National Electrical Code activities and will be prepared to furnish most of the quality wire and cable products described in the 1956 Code.

NEW WIRE AND CABLE TYPES IN THE 1956 NEC

Type	Approved Size Range	Insulation	Voltage Rating	Temperature Rating	Special Provisions
RHH Building Wire	14 AWG Through 2000 MCM	Heat-Resistant Rubber	600	90C (194F)	General-purpose Single-conductor building wire. In dry locations.
SPT-3 Flexible Cord	18 AWG Through 12 AWG	Thermoplastic (Combined Insulation and sheath)	300	60C (140F)	2- and 3-Conductor Parallel Flexible Cord. For use in Refrigerators or Room Air Conditioners and damp places. Not for hard usage.
SF-1 Fixture Wire	18 AWG Solid or 7 Strand	1/64 inch Silicone Insulation	300	200C (392F)	Special High-temperature Silicone-insulated Glass-braided Fixture Wire for wiring recessed fixtures, etc.
SF-2 Fixture Wire	18-14 AWG Solid or 7 Strand	1/32 inch Silicone Insulation	600	200C (392F)	
SFF-1 Fixture Wire	18 AWG Flexible Strand	1/64 inch Silicone Insulation	300	200C (392F)	
SFF-2 Fixture Wire	18-14 AWG Flexible Strand	1/32 inch Silicone Insulation	600	200C (392F)	

ROME CABLE CORPORATION, Rome, New York

Better Suki-Yaki Electrically

Japanese Cook Kiyo Takemoto gets some kibitzing from the sideline as she whips up suki-yaki on automatic electric range at Chicago's 2nd annual International cooking contest. Started last summer by Chicago Electric Association, contest draws various nationality groups from Chicago area who try hand at cooking native dishes the electric way. Each preliminary contest winner (best German cook, best Irish cook, etc) is awarded range which, in turn, is used to raise funds for the group she represents. Grand prize-winner (this year a Swiss lady who baked best angel food cake) gets $1,000 worth of electric appliances and housewares. Event pulled more than 1,300 requests for recipes.

Electric Program Winners Convened in Chicago

Forty-four rural girls and boys from across the nation have been awarded expense-paid trips to the National 4-H Club Congress in Chicago recently for being selected as state winners in the annual Electric Program. In addition to these 44 winners from the U. S., there were two more from Hawaii and Puerto Rico, both of whom will receive a $100 U. S. Savings Bond in lieu of the trip to Chicago.

The Electric Program is sponsored by Westinghouse Educational Foundation, which is supported by Westinghouse Electric Corp. The Foundation provides the expense-paid trip to the 4-H Congress for boys and girls who have excelled in electrical projects to improve their homes or farms.

Six of the group will be chosen as national winners; they will receive $300 scholarships.

These 44 winners raise the total number of Congress Club trip winners to 711 since the program was founded. In the same time, 117 received college scholarships.

The Electric Program was founded 21 years ago. At that time there were only 2,000 participants; today there are more than 800,000.

S&S SHORTS

Cincinnati to Host Exposition

Cincinnati will play host, as she did so often in the thirties, to the National Electrical Progress Expositions. These shows, which were a yearly standard before World War II, are coming back in what is hoped will be a bigger and better style than ever. The next one is scheduled for February 9-17 at the Cincinnati Gardens. Attendance is expected to exceed 100,000, the general committee on the exposition reported. Details available from Cincinnati Electrical Association, 1106 Fifth Third Bank Building, Cincinnati 2, Ohio. Write today!

Light Conditioning

Over 85% of the new homes built in and around Wichita, Kan., last year have above average lighting because builders in that area were sold on the benefits of light conditioning, according to a spokesman for Kansas Gas & Electric Co. KG&E builds sales by awarding builders a bronze plaque to be put on structures that have been light conditioned. The utilities standards are said to be higher than average, but not so high that all builders cannot meet them. Approximately 4,300 of the 5,000 homes put up in the area last year had an average increase in power demand of 1 kw.

$23 Billions for Appliances!

Americans will spend more than 23 billion dollars on major appliances during the next five years, it was predicted recently by H. F. Lehman, GM vice president and head of Frigidaire. Analyzing present and future sales trends, he said that consumption of major electric appliances for 1956 would exceed 13,800,000 units—a record-breaking total topping 1950, the industry's best previous year. By 1960, it is figured that over 18,000,000 units will be going into American homes.

Spokane Gets Lighting Bureau

"Inland Empire Certified Lighting Bureau" is the name given to the new organization, sponsored by Inland Empire Electrical League, which will serve the eastern half of the State of Washington. Headquarters are in Spokane. The new organization is affiliated with National Lighting Bureau, New York.

B&W, Bailey Co Design Steam Plant Analyzer

An electronic system, designed to analyze the operation of a large steam generating unit in a few hours, has been developed jointly by Babcox & Wilcox Co and Bailey Meter Co. Ordinarily, the analysis would require weeks of work by a team of specialists.

By means of "sensing" elements linked to analog scanners, the system can probe many different boiler locations. At the touch of a button, it begins gathering such data as temperature, pressure and gas composition. Electronic devices sort the information, supplement it with pre-set figures, and punch it in code on continuous tape.

Tape readings are transmitted by teletype to New York City, where B&W has a large electronic computer. Translated automatically into code suitable for computer use, the information is processed mathematically and transmitted back to the boiler site for application by engineers and technicians.

The new system has been developed to help engineers determine quickly and economically such boiler problems as sources of heat losses, the most efficient types of fuels, and when and where to remove combustion waste deposits. B&W authorities pointed out the need for a method of correcting material or operating faults promptly. They said that the system also represents an effort to conserve critically short engineering manpower by reducing the number of people and the amount of time required to conduct boiler analyses.

The "brain" of the system is a centrally located electronic coordinating unit developed at the B&W Research Center at Alliance, Ohio. A special "scanning" device created by Bailey Meter Co of Cleveland, Ohio, makes it possible for the system to gather data from widespread points of a boiler. Each scanning unit collects information from 25 different sensing elements. Any number of these devices may be hooked up with the system, depending on the quantity and location of points from which information is desired.

Recently the system underwent performance tests at West Penn Power Co's Springdale, Pa., station, where it was used to gather data from 140 locations of one of the boilers. A speed check of 140 items, plus 12 additional factors—for a total of 152 readings—was transmitted to New York. An analysis was made, and the data returned to Springdale in 37 minutes.

ACCURACY of data transmission is checked by W. T. Hage of B&W. He is communicating with computer group in New York

Potentials of the new equipment will be more fully realized, B&W officials believe, when it is applied very soon to the first of three steam generating units of a new type being built by B&W on the American Gas & Electric Co's system. This unit, at Ohio Power Co's Philo plant near Zanesville, Ohio, reportedly will utilize the highest steam pressure and temperature ever used in commercial production of electric power. Data will be gathered from 500 different locations at the Philo unit. It is felt that the system will conserve both manpower and money during the boiler's "proving out" stage, and provide performance data of a type unobtainable in the past.

Officials of the two companies revealed that the system will be applied in future tests not only to boilers, but to a broad range of equipment used in conjunction with them.

Penn-Union Fittings Make A-Frame Bus Connectors

Welded fittings have been developed which permit field assembly of aluminum bus A-frame connectors with straight-cut lengths of tubing. The fittings were designed by Penn-Union Electric Corp, Erie, Pa.

One aluminum fitting has a cylindrical boss in which a straight-cut tube is seated, and a curved saddle for mounting on a tubular connector. Another fitting has two bosses and a curved saddle. The combination of fittings, welded to two pieces of tubular bus, form an A-frame. This assembly provides a welded connection to join one bus above another bus in substations.

The design is reported to give a low cost for set-up and welding, to facilitate alignment of tubular busses in air, and to compensate for minor differences, such as error in cut-off and changes in ground conditions.

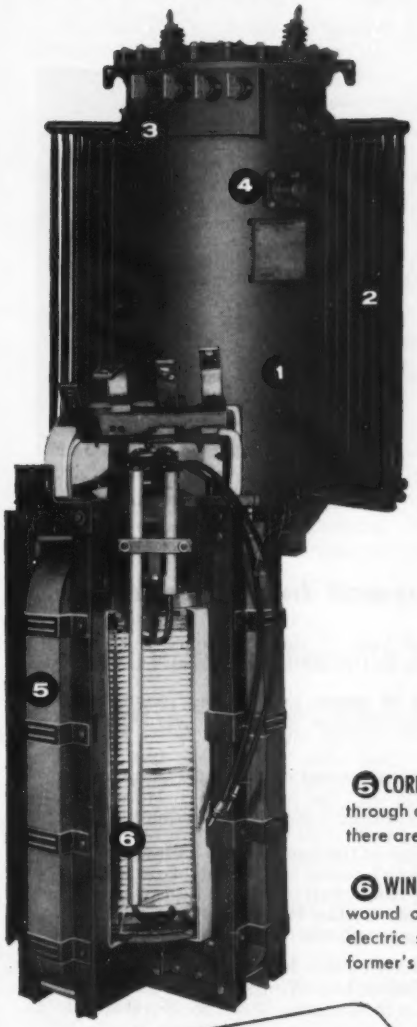
A-C Building Condensers for AG & E System

Two 225,000-sq ft twin-shell surface condensers are being supplied by Allis-Chalmers Mfg Co to American Gas and Electric System, A-C reported recently. One is for the new $58-million plant to be constructed by Indiana & Michigan Electric Co on the Wabash River near Terra Haute, Ind.; the other for Philip Sporn plant.

(*Continued on page* 59)

Wagner Form W Substation Transformers

...in ratings through 500 kva, voltages to 67,000



Wagner Form W Transformers are available for every requirement of modern distribution systems—from 3 to 500 kva, with high voltages from 480 to 67,000 volts. In all ratings you get the excellent performance and complete dependability for which Wagner Transformers have been noted for 65 years . . . plus the compact design and light weight that makes Wagner Form W Transformers easy to handle and install.

Check these important features of 250 to 500 kva ratings:

1 HOUSED IN ROUND TANKS . . . inherently strong . . . compact . . . light in weight.

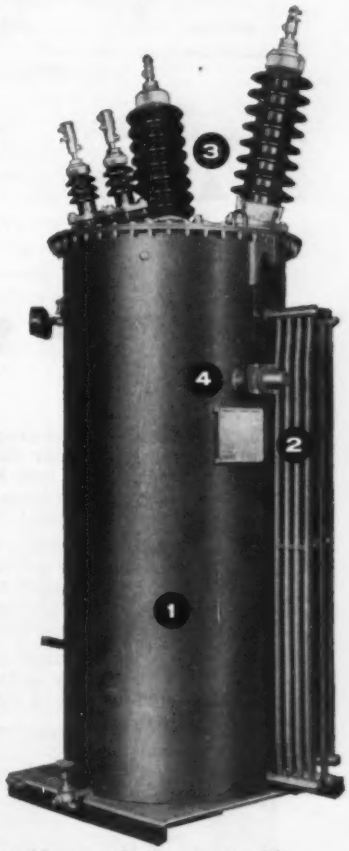
2 ELLIPTICAL TUBE RADIATORS for efficient cooling . . . provide maximum radiating surface in minimum space.

3 BUSHINGS ASA standard high voltage bushings on transformers 23 KV and above (right). Locked tank wall bushings on transformers with low voltage ratings, 600 volts and below, (left).

4 WEATHER-PROOF, TAMPER-PROOF TAP CHANGERS . . . operating handle is protected by cover which shows tap position . . . can be padlocked.

5 CORES are of cold-rolled, oriented grain steel, wound through and around the coils. In ratings from 250 to 500 kva, there are 4 core sections spaced 90° apart.

6 WINDINGS . . . high voltage and low voltage coils are wound on insulating cylinders of high mechanical and dielectric strength . . . the winding best suited to each transformer's rating, voltage and current is used.



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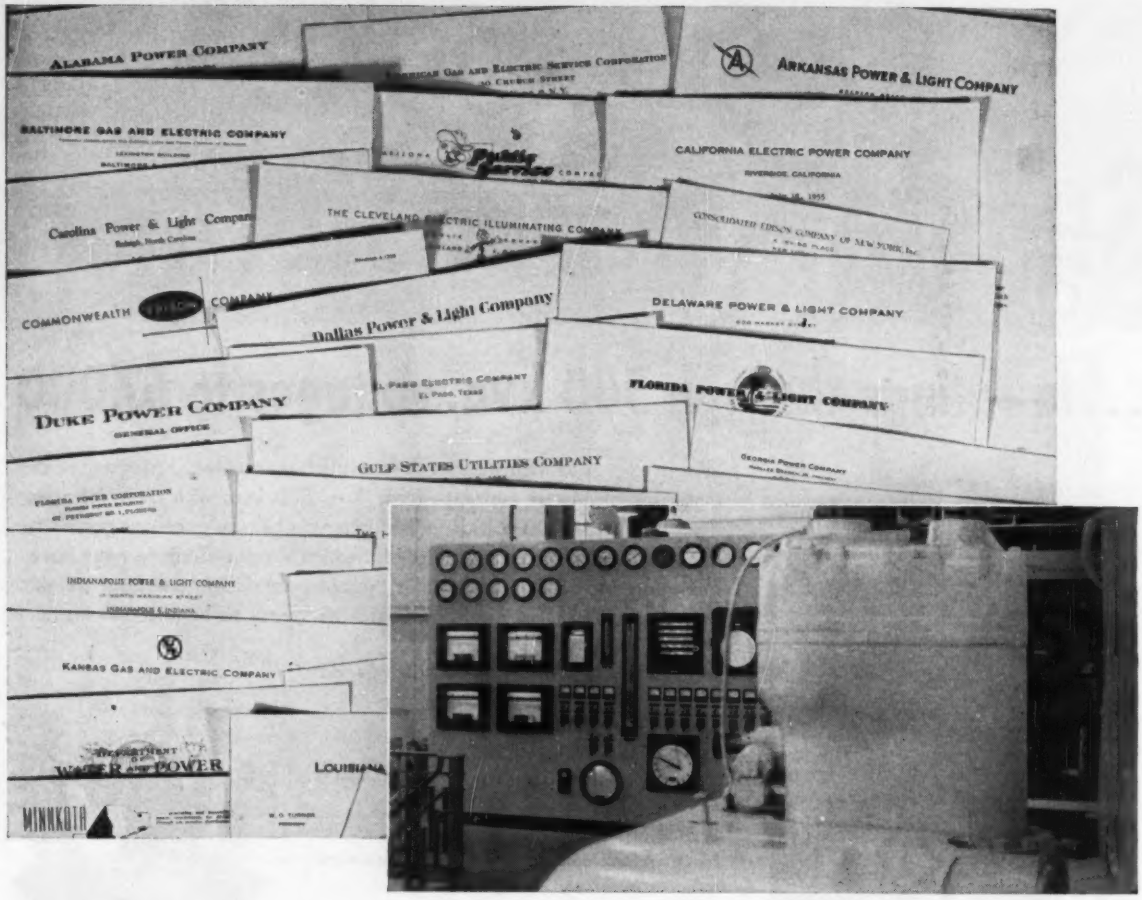

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when you choose . . . Honeywell instrumentation

You join America's best-known electric power generating companies in your choice of instrumentation by Honeywell. You'll find Honeywell instrumentation everywhere . . . in large stations and small. The reasons for this are clear.

With the precision, stamina, and reliability of Honeywell instruments, you get an important extra . . . service. This service begins with your first plans, and continues long after your instruments are installed. It includes:

Application engineering of instrumentation, custom-fitted to your plant by a staff experienced in power station measurement and control.

Installation and startup assistance by Honeywell service engineers.

Maintenance engineering, in emergencies or on a periodic service schedule, by factory-trained specialists located near you . . . in the more than 112 Honeywell offices in the United States and Canada.

Quick shipment of spare parts, from your local Honeywell branch office or from the Parts Depot in Philadelphia.

Training of your instrument men in up-to-date maintenance methods at the tuition-free Honeywell Education and Training Center in Philadelphia.

These are but some of the benefits you gain when you add your company's name to the list of prominent companies using Honeywell instrumentation. Get the full story from your nearby Honeywell sales engineer. He's as near as your phone.

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MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

A-C Building Condensers

(*Continued from page 56*)

of Ohio Power Co and Appalachian Electric Power Co.

The 450,000-kw turbine generators, used in connection with the condensers, will have two separate exhausts. Therefore, each condenser will consist of two 112,500-sq ft units placed side by side. Delivery is scheduled during 1958.

Chance Co Radio Speeds Materials Handling in Plant

A. B. Chance Co has installed a two-way radio "network" in the Centralia, Mo., plant. This system is reported to save time and steps and to speed up materials handling.

Three transmitter-receiver units have been installed. The "base station" is in the machine shop office. One mobile unit is on a material handling truck and another is on a dump truck.

The transmitters have a range of about three miles and operate at 154.57 mc.

Aluminum Production

Primary aluminum production in the United States was 149,127 tons in October, according to the Aluminum Association, New York. The amount was an increase of 16,811 tons over the production of 132,316 tons in September, and an increase of 14,471 tons over the 134,656 tons produced in October, 1955. Total aluminum production for the year through October was 1,385,777 tons, up almost 94,500 tons for the corresponding 1955 period.

I-T-E Has Analyzer

I-T-E Circuit Breaker Co has a network analyzer available to public utility companies, manufacturing industries and consulting engineers for making power system studies. The analyzer may be had on a fee basis. It is said to be capable of simulating any electrical system which may be represented by 12 generators, 88 lines, 32 loads, 16 transformers and 150 buses.

U. S. Copper Production

Primary copper production in the United States during October amounted to 94,955 tons, reports the Copper Institute, New York. This was an increase of almost 6,300 tons over September's production. Refined production in October was 136,379 tons, up 23,895 tons from September. Deliveries to fabricators amounted to 113,353 tons, an increase of about 8,870 tons over the previous month. Refined stocks at the end of October was reported to be 106,120 tons, which was about 12,920 tons more than at the end of September.

GE Developments

General Electric Co has reported the following items:

- An all-out sales campaign for the company's full line of closed-circuit television equipment by the Broadcast Equipment Section and the Apparatus Sales Division.
- Favorable results in tests of the gas turbine vessel JOHN SARGEANT off the Virginia coast.
- Completion of the move of the Atomic Power Equipment Department from Schenectady, N. Y., to San Jose, Calif.
- Exportation of an 85-ton, 125,000-kw turbine-generator—reported to be the highest rated ever exported—to Japan for installation at Tokyo Electric Power Co.
- Grouping of the company's principal lines of insulating materials into a single organizational component.
- Appointment as national distributor of Empire Products' recently developed "Cam-lok" neoprene insulated cable connector.
- Decrease of about 20% in the prices of the company's electrical and electronic equipment components known as Thermistors.

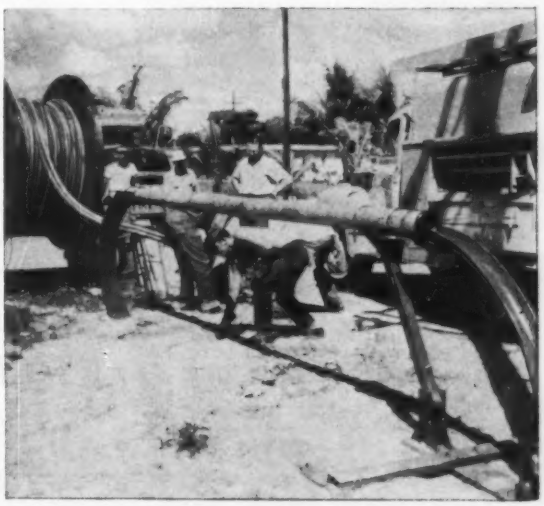
Cable-Pulling Tool Is Used by Florida Utility

Development of a cable-pulling tool, illustrated, is said to provide a simple, safe and efficient method for installing cable and riser conduit on a pole. The installation is made after the cable has been pulled through the riser prior to raising and into the manhole.

This tool is a product of Cable Equipment Co, Miami, Fla. It was designed by underground engineers of Florida Power & Light Co.

The cable-pulling tool has three parts: An arched trough to guide the cable from the conduit to the riser elbow; a pivoted supporting arm; and a curved conduit support which serves as a guide for the free end of the cable when the conduit is raised. (R-L in illustration)

Florida P & L's use of the tool has solved a problem of excessive pulling tension at the pole riser elbow. It reports savings by elimination of manholes and cable damage. And cable pulling crews find the tool gives good performance. Formerly, the cable was fed in at the manhole, pulled through the duct and up the already installed conduit.



BUSINESS OUTLOOK

Electrical World
DECEMBER 3, 1956

Government will play a considerably more active role in the economy next year than it did this year. Right now it appears that when all budgets—federal, state and local—are totaled up, they will run $4 to $6 billion over 1956. The increase will split about evenly between the federal, state and local levels.

• • •

The Defense Department was budgeting a $2 to $3 billion increase even before the assorted military crises erupted in the Near East and Hungary. The growing complexity of weapons and rising cost of materials lay behind the projected hike. Now that the international situation has taken a switch for the worse, a cut in the armed forces is unlikely and procurement schedules may be stepped up. That means that the budget may have to be fattened up even more.

• • •

The highway program will add a large-size chunk to the outlays of both federal and state governments next year. The entire program will cost between $5 and $6 billion in 1957. In general it appears that the states plan to maintain their rate of spending on local systems and will boost spending on the interstate system enough to get the full measure of federal aid. On this basis, new highways will add $600 to $800 million to government spending next year. Other programs, such as the soil bank, school building and the construction of public building will also pick up speed.

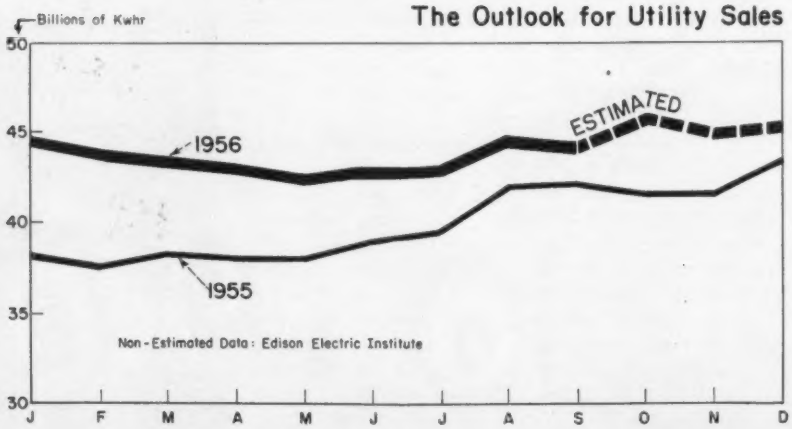
• • •

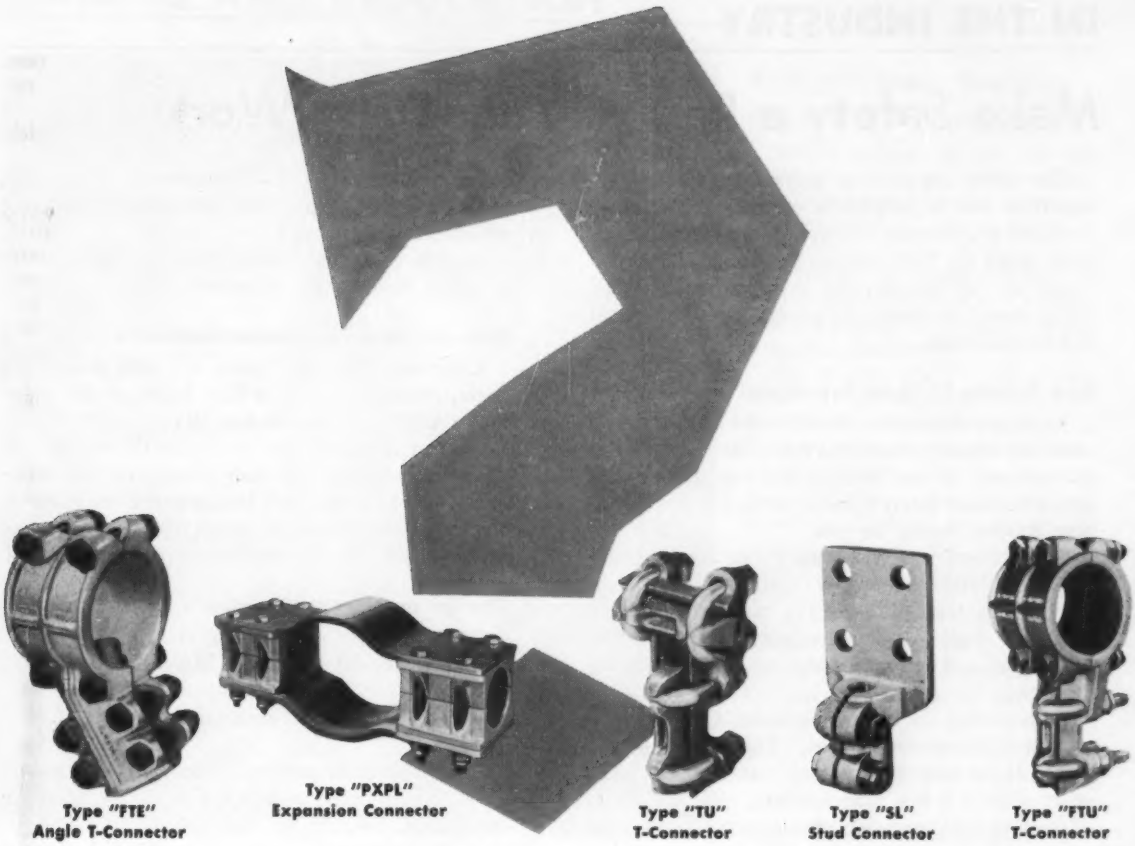
Public building will probably come as a welcome boon to the construction industry next year and may salvage it from a modest dip. The Commerce-Labor Departments estimate that private housing starts will probably total about a million—the lowest since 1949. Many new houses will be larger, but they will not cost enough more to maintain the dollar value of residential housing construction if the drop in starts materializes. Industrial building will probably remain about the same as this year. Thus, public construction will power most of the gains the construction industry realizes next year.

• • •

Year-end retail sales, long expected to add the final fillip to carry business activity to an impressive climax, were disappointing in September. Department store sales (seasonally adjusted) were also down in October and the first few weeks of November. Roaring Christmas business may make up for a slow October; and over-all retail sales are sure to benefit from auto sales. But even if these lines do not pick up, retailers can't miss wrapping up the best year ever.

The Outlook for Utility Sales





Type "FTE" Angle T-Connector

Type "PXPL" Expansion Connector

Type "TU" T-Connector

Type "SL" Stud Connector

Type "FTU" T-Connector

What's your power connector problem?

Frequently, power connections require an unusual type connector—or a special one designed or adapted to the exact purpose. If you have such a problem, there's an easy way to solve it.

Here's the likely answer—

The answer may be in one of two directions. First, you may obtain the exactly right connector from Delta-Star's complete line. Delta-Star offers tubing to tubing connectors, cable to cable, tubing to cable, tube or cable to bar, square tubing, flexible connectors, grounding and stud connectors, terminal lugs and others.

Your second choice is to take your special problem to your Delta-Star representative. Delta-Star may have already engineered and manufactured the exact connector you need.

You'll get what you want—in design and quality—when you make Delta-Star your power connector supplier.

Ask for your copy of Delta-Star's complete Power Connector Catalog 38-E.

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Make Safety a Part of Your Daily Work

The safety engineer is playing an increasingly important role in progressive electric utilities. This is shown in a number of ways. More recognition is being given for safe working performances. House organs devote considerable space to safety hints. Safety award programs are gaining on both a local and national scale.

New Orleans PS Holds First Place

As of mid-November New Orleans Public Service could lay claim to being the safest electric utility in the nation. It was holding the top spot in this year's National Safety Contest without a single lost-time accident during the year.

Close behind was Wisconsin Public Service Corp, which had established a new record in its own company with a total of 2,446,171 man-hours worked without a single lost-time accident. The Wisconsin utility has suffered one lost-time accident during this year.

Commenting on the performance, C. B. Boulet, vice president-personnel said, "The new man-hour record is the equivalent of one man working 1,102 years without a lost time accident. We are proud of the safe working habits of our people, not for the sake of a record, but because it means that they have not suffered crippling nor fatal injuries due to their work."

Union Electric Abandons Use of Tetrachloride

After an extensive testing program, Union Electric Co has directed its departments to abandon use of carbon tetrachloride as a solvent. The matter was brought before the Management Safety Policy Committee, which then initiated studies to determine the hazards of tetrachloride and to find suitable substitutes. Two substitutes have been found, both less toxic than tetrachloride and one which is non-flammable.

This is the kind of study being given to safety problems in a number of electric utilities.

Rules for Handling Aerosol Containers

Cincinnati Gas & Electric Co and the Union Light, Heat, & Power Co have issued recent warnings against improper handling of aerosol containers. Discarded container are not to be thrown in fires or in incinerators, and they should not be punctured. Nor should they be accessible to children. Full containers should be stored where they will not be subjected to high temperatures or direct sunlight.

Tips for an Effective Program

Prof George W. Harper, University of Illinois lists these seven essentials for an effective company safety program:

1. Top management must take an active responsible part.
2. A system of medical placement examinations must be established as well as first aid for treatment of injuries.
3. Safe practices must be established through training of supervisors and employees.
4. Leadership with a single individual in charge is a must.
5. Safety engineering is required to maintain safe working conditions.
6. An accident system must be kept to evaluate and measure progress in safety.
7. Safety promotional activities should be used to promote acceptance of the safety program and a feeling of personal responsibility in employees.

TECHNICAL NOTES

Wire safety pins for permanently attaching "Hold Tags" to switch chains were made of No. 6 scrap wire by Central Maine Power Co to eliminate the weak strings formerly used.

Adding a light pickup truck to a 5-6-man line crew equipped with a line truck and digger speeds the job of building short additions or extensions to distribution lines in rural areas, reports a western utility. The pickup, which carries a portable generator, can: haul additional material to the site; power impact tools for drilling crossarms, gaining poles, etc, in advance of the line crew; and be used by the foreman to supervise better all phases of the work up and down the line.

Dust dry enough to blow coats insulators rapidly. Flashover follows when first moisture makes dust conducting.

U. S. Geological Survey of 1950 shows over 95% of recoverable coal still lying in reserve.

Dixons Greet Company Stockholders

Middle South Utilities, Inc, stockholders Mrs Elvera Zink and Mrs Effie Fechtig (seated) discuss the regional stockholder's meeting held in San Francisco recently, the first they've attended. Mrs and Edgar Dixon, president Middle South, look on.

Dixon told the stockholders that subsidiaries will float around $25 million in first mortgage bonds in 1957. The parent Middle South will need $15 million of outside capital through 1959 for equity investment in the operating companies and to retire a short-term $1.8 million bank loan. It has not been decided whether this will be done through an offering of "a modest amount of common" late next year or other means, said Dixon.

Federal Court Retains Utility Franchise Case

U. S. Judge Ewing T. Kerr has overruled a motion of the city of Sheridan, Wyo., to remand back to Wyoming state court a suit brought by the city to invalidate its franchise with Montana-Dakota Utilities Co.

Sheridan City attorney Kenneth Chetwood said the city seeks to invalidate the ordinance on grounds that it was passed in an illegal manner. The suit was file originally in district court and MDU was successful in having it transferred to federal court. Hearing is set for August 1957.

The ordinance passed June 21, 1955, granted MDU a 25-year right to serve Sheridan and cut the utility's franchise fee to 1% of the gross revenue from Sheridan city customers instead of 1% of the revenue from customers of the entire county.

Yankee Atomic Requests Approval of Financing

Yankee Atomic Electric Co has asked authority from the Massachusetts Department of Public Utilities to issue $500,000 in common stock and to borrow $1 million from its utility shareholders. The funds will be used towards the construction of a 134,000 kw, $35 million plant scheduled for completion by 1960.

The petition to DPU was signed jointly by six utility stockholders: New England Power Co, Boston Edison Co, Western Massachusetts Electric Co, Montaup Electric Co, New Bedford Gas & Edison Light Co, and the Cambridge Electric Light Co.

Harry Hanson, the treasurer of Yankee, told DPU that the Bay State stockholders proposed to subscribe for shares totaling $277,500 and the balance of the issue would be subscribed for by the remaining New England utilities who are also stockholders.

FINANCIAL BRIEFS

Common Stock Dividend Increases—Texas Utilities will pay Jan. 2 a quarterly dividend of 36¢ a share as against 32¢ in the previous quarter . . . Union Electric Co will pay Dec. 27 a quarterly dividend of 38¢ a share as compared with 35¢ previously . . . Detroit Edison Co will pay Jan. 15 a quarterly dividend of 50¢ a share versus 45¢ in the preceding quarter.

Halsey, Stuart & Co has won an issue of $10 million **Texas Power & Light Co** first mtg bonds due 1986 with a bid of 100.39% for a 4⅜% coupon; reoffered at 101.25% to yield 4.30%

Consolidated Edison Co of New York is planning to sell about $55 million of convertible debentures early in 1957. They will be offered to common stockholders for subscription.

Arizona Public Service Co has purchased the San Pedro Natural Gas Service Co. It is subject to approval of the Arizona Corporation Commission.

Future Financing

A Busy Ten Days

Underwriters will be busy for the first ten days of December. In addition to selling $145 million electric and gas issues, they will have two large offerings by industrials of convertible debentures totaling about $60 million.

Utility Financing Active

Utilities will continue to be very active in the money market, particularly in the first quarter of 1957. Already on the calendar are issues totaling $420 million for January, February, and March. These companies are relying heavily on financing with debt. 86% of the amount scheduled for the first quarter will be in bonds.

Watch Interest Limits

Be careful of the limitations put on interest rates and prices when writing the terms for a sale of bonds. Underwriters could not bid for the $54 million Greenwich-Killingly Expressway bonds because the restrictions placed on acceptable interest rate and selling price would have resulted in a yield below the present market level for tax-exempts.

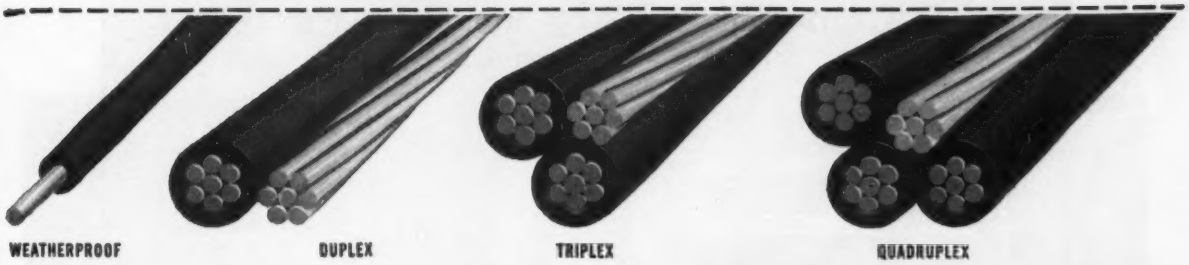
Due Diligence Meetings

December 6, Florida Power & Light Co; December 6, Delaware Power & Light Co; January 11, Louisiana Power & Light Co, and January 17, Atlantic City Electric Co.

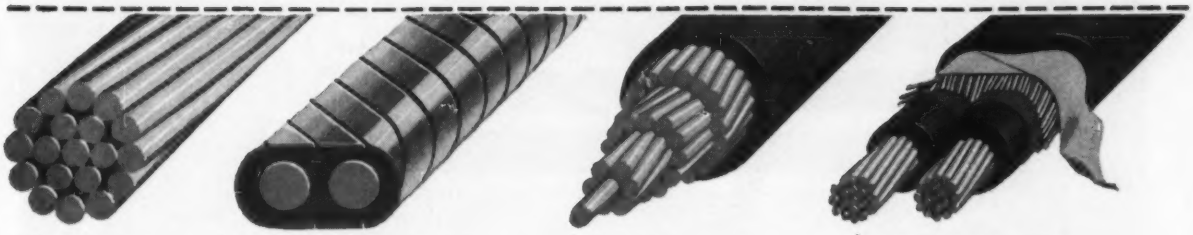
(Furnished by the Irving Trust Co from the "Financing Calendar")

DATE	COMPANY	Amount of Offering (Millions) DEBT	EQUITY
DEC.			
1	Burroughs Corporation	$30.1-N-cv-rt	$.....
3	Dallas Power & Light	10.0-C	.....
4	Michigan Bell Telephone	30.0-C	.....
4	Public Service Electric & Gas	.....	33.0-N COM
4	National Cash Register	28.3-N-cv-rt	.....
5	Long Island Lighting	20.0-C	.....
10	Arkansas Louisiana Gas	.....	18.0-N#COM
11	Florida Power & Light	15.0-C	.....
11	Delaware Power & Light	.....	8.0-C Pfd
12	Texas Eastern Transmission	40.0-N	.....
17	May Department Stores	.....	18.0-N
DEC.			
No Date	Massachusetts Port Authority	115.0-C-R	.....
	Memphis Power Plant	154.0-N	.....
	General Telephone	.....	32.0-N COM
4th Quarter of 1956 (Month not indicated)			
	Kansas Nebraska Natural Gas	6.8-P	.....
	U. S. Rubber	50/60.0- -cv-rt	.....
	North Carolina State School	25.0	.....
	J. P. Stevens	30.0-P	.....
	Southern Nevada Power	7.0-C	.....
	Ohio Thoroughfare Revenue	50.0-C	.....
	Sacramento Utility District	85.0	.....
	Grand River Dam Auth., Okla	27.0	.....
	Hetch Hetchy, California	54.0	.....
	Mississippi Valley Gas	1.5/2.0-P	.....
	New York State Grade Crossing	25/40.0	.....
	Missouri State	.....	.....
JAN.			
7	General Telephone of California	.....	5.0-N Pfd
8	New England Telephone & Telegraph	35.0-C	.....
10	Pacific Power & Light	20.0-C	.....
15	Louisiana Power & Light	20.0-C	.....
16	U. S. Governments	1,600.0-R	.....
21	Southwestern Gas & Electric	10.0-C	.....
23	Atlantic City Electric	10.0-C	.....
29	Oklahoma Gas & Electric	20.0-C	.....
JAN.			
No Date	New England Power	10.0-C	.....
	Niagara Mohawk Power	50.0- -cv-rt	.....
	Mountain States Telephone & Telegraph	35.0-C	.....
	Douglas Aircraft	25.0-N-cv	.....
FEB.			
4	Public Service of Oklahoma	10-12.0-C	.....
5	Public Service of Indiana	30.0-C	.....
15	U. S. Governments	9,000.0-R	.....
FEB.			
No Date	Consolidated Edison	55.0- -cv-rt	.....
MAR.			
15	U. S. Governments	3,000.0-R	.....
MAR.			
No Date	General Public Utilities	.....	23.0- -rt COM
	West Penn Electric	.....	10/11.0-C-rtCOM
	Appalachian Electric Power	24.0-C	.....
	Southwestern Public Service	.....	7.3-N-rtCOM
	New Orleans Public Service	6.0-C	.....
1st Quarter of 1957 (Month not indicated)			
	Northern Natural Gas	24.0-N	.....
	Indianapolis Power & Light	.....	6.0-N Pfd
	Washington Gas Light	.....	5.0-N Pfd
	Pioneer Natural Gas	15.0-P	.....
	Kentucky Utilities	.....	4/6.0- -rt COM
	Southern Counties Gas	15.0-C	.....
	Kansas City Power & Light	20.0-C	.....
	Metropolitan Edison	22.0-C	.....
	Rochester Gas & Electric	12.0-C	.....
	Otter Tail Power	5.0-N	.....
	Philadelphia Electric	30.0-C	.....
	Hawaiian Electric	7.0-P	.....
	Southern Indiana Gas & Electric	5.0-C	.....

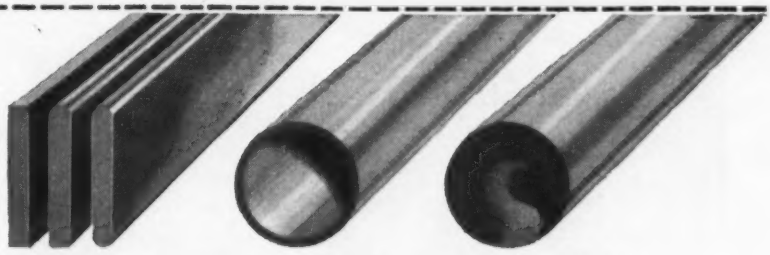
Symbols: C—Competitive; N—Negotiated; P—Private; R—Refunding; cv—Convertible rt—Rights; Pfd—Preferred; COM—Common. *Estimated. #Not company financing.



WEATHERPROOF DUPLEX TRIPLEX QUADRUPLEX



ASCR • ALL-ALUMINUM • AAAC ARMORED SERVICE DROP BUILDING WIRE SERVICE ENTRANCE CABLE



BUS CONDUCTOR: RECTANGULAR TUBULAR SOLID

Yes, your KW distributor carries it!

YOUR KW DISTRIBUTOR carries a *wide range* of the KW products shown here. So why not take full advantage of this convenient local source of supply? Make it a habit to call your KW distributor *first.* (Refer to the list shown and see your local telephone directory.)

Kaiser Aluminum & Chemical Sales, Inc., *Executive Office,* Kaiser Bldg., Oakland 12, California; *General Sales Office,* Palmolive Bldg., Chicago 11, Illinois.

See "THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network. Consult your local TV listing.

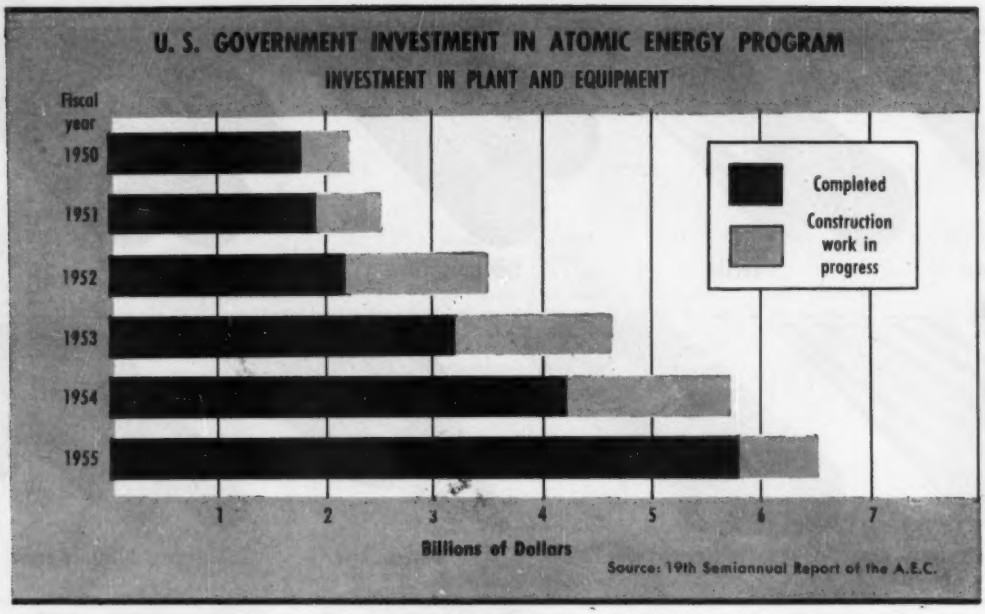
FOR GOOD DISTRIBUTOR SERVICE

Kaiser Aluminum

Aluminum is the answer to Adequate Wiring

KAISER ALUMINUM DISTRIBUTORS
CONVENIENTLY LOCATED TO SERVE YOU:

Brown-Roberts Electric Co.
Capital Electric Supply
Central Electric Supply Co., Inc.
Champion, Inc.
Corpus Christi Hardware Co., Inc.
Crescent Electric Supply Co.
Cummins Supply Co.
W. E. Duncan Co.
Electrical Wholesalers, Inc.
Eoff Electric Co.
Evans Electrical Supply Co.
Fairmont Supply Co.
Florida Electric Supply, Inc.
Gem City Electric Co.
General Electric Supply Co.
Heider Electric Supply
H. E. P. Supply Co.
Hunsicker Brothers
Interstate Electric Co.
Stuart C. Irby Co.
Line Material Co.
Lighting Fixture & Electric Supply Corp.
Mack Electric Supply Co.
Maydwell & Hartzell, Inc.
Monroe Hardware Co.
Nelson Electric Supply Co.
Ozark Electric Supply Co.
Southern Minnesota Supply Co.
Stubbs Electric Co.
Temple, Inc.
United Electric Supply Co.
Vermont Hardware Co., Inc.
George H. Wahn Co.
Waltrip Electric Co.
Weaks Supply Co.
Wells Electric Supply Co.
Westinghouse Electric Supply Co.



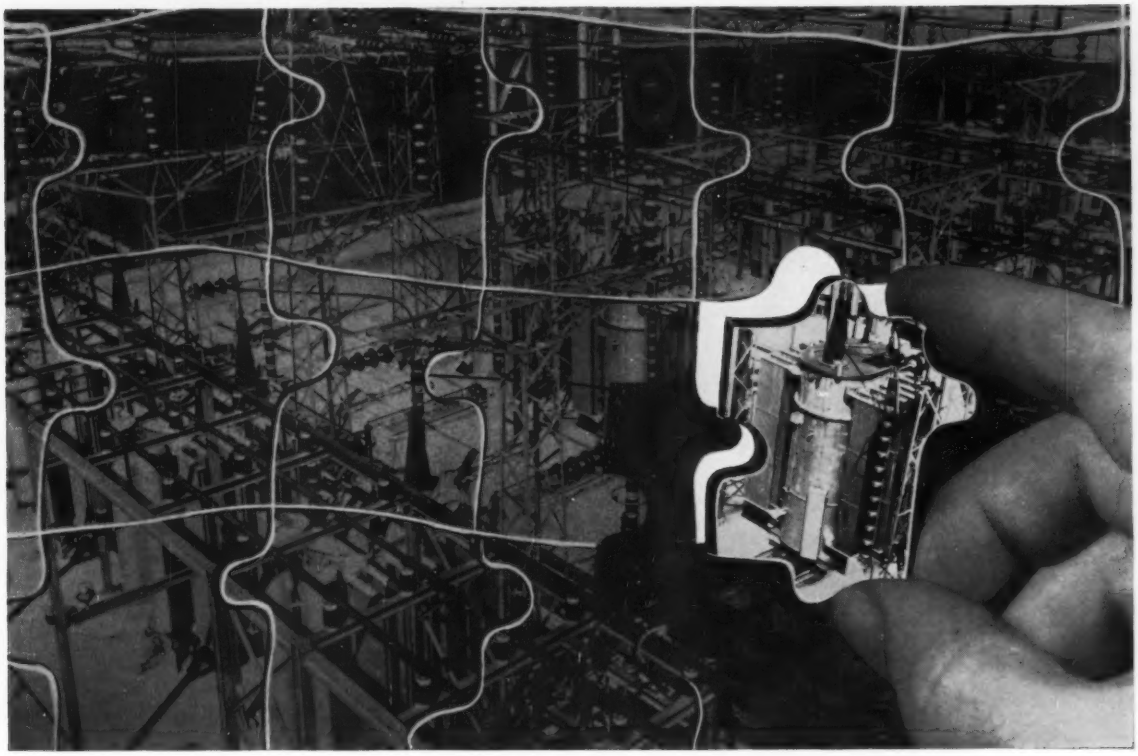
Power Statistics . . .

			Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	million kw	Sept.	118.66	118.01	110.91	7.0
Peak—Class 1 Systems	million kw	Sept.	96.05	98.0	90.1	7.1
Estimated Dec. '56 Peak	million kw	Aug.	106.10	106.09	103.83	2.2
Production—billion kwhr		Sept.	48.82	52.19	46.33	5.4
Hydro			8.96	9.54	8.18	9.5
Fuel			39.86	42.66	38.18	4.4
Sales—billion kwhr		Sept.	46.07	46.11	43.39	6.2
Residential			11.68	11.60	10.63	9.9
Commercial			7.82	7.95	7.36	6.3
Industrial			23.86	23.78	22.72	5.0
Other			2.72	2.78	2.68	1.5
Fuel Consumption		Sept.				
Coal—million tons			12.45	13.18	12.07	3.1
Oil—million barrels			5.20	5.18	5.18	0.4
Gas—million cu ft			124.63	142.04	119.85	4.0
Net Income Class A & B Co's—$ million		Sept.	108.45	97.17	100.18	8.3
Residential Customers—millions		12 mos.	45.25	45.10	43.95	3.0
Revenue per kwhr		ended	2.61¢	2.61¢	2.66¢	−1.9
Avg kwhr per customer		Aug. 31	2,914	2,899	2,682	8.7
Avg annual bill			$76.06	$75.66	$71.34	6.6

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	Oct.	150	145	147	2.0
ENR Construction Cost	Nov.	147.6	147.6	141.1	4.6
BLS Cost-of-living	Oct.	117.7	117.1	114.9	2.4
New Orders for Machinery (1950 = 100)	Oct.	137.0	136.0	130.0	5.4
NEMA Sales					
Insulation materials	Sept.	147	153	156	−5.8
Electric appliances		101	100	114	−11.4
Wholesale prices	Sept.				
Motors and generators		136.2	133.3	125.1	8.9
Transformers and regulators		144.8	139.7	129.2	12.1
Switchgear and fuses		157.0	153.8	146.1	7.5
GNP—annual rate—$ billion	3rd Qtr.	413.8	408.3	396.8	4.3

PERFECT FIT...



Casually observed, a utility system might appear as a gigantic jig-saw puzzle. To those responsible for system operation however, the pattern is clear and defined.

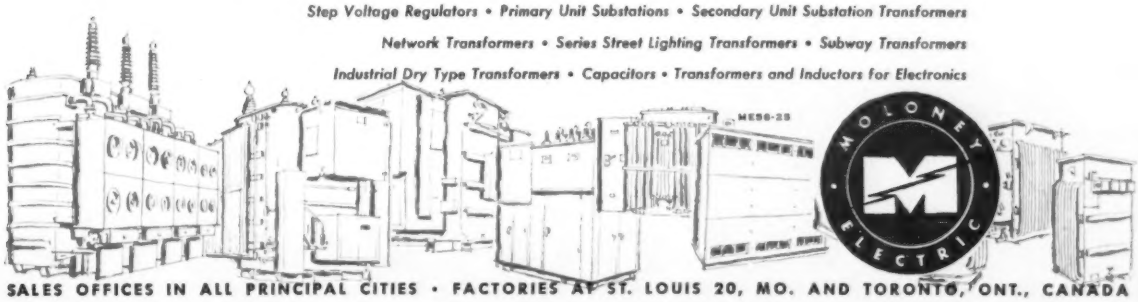
Each segment . . . each function . . . each piece of apparatus . . . has been carefully planned, assembled and integrated according to a blue print for service.

To that end, all of the varied equipment necessary, must fit perfectly into the utility picture, much as a piece from a jig-saw puzzle.

In the case of Moloney, perfect fit into the utility picture is assured because Moloney Transformers are the result of years of experience in producing quality products. This experience applied within the finest facilities in the industry is available to all utilities to help with today's problems . . . and tomorrow's.

MOLONEY ELECTRIC COMPANY

Power Transformers • Distribution Transformers • Load Tap Changing Transformers • Regulating Transformers
Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substation Transformers
Network Transformers • Series Street Lighting Transformers • Subway Transformers
Industrial Dry Type Transformers • Capacitors • Transformers and Inductors for Electronics

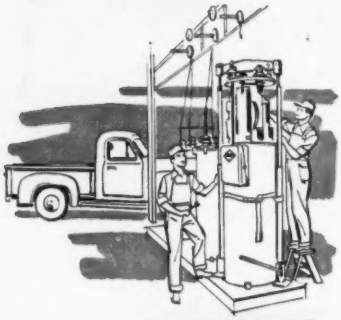


SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

How to Reduce Regulator Service Costs

Compare

Servicing Allis-Chalmers Regulators **vs** **Servicing Other Regulators**



1—Drain oil from tank

2—Remove cover, bushings and control leads

3—Piecemeal untanking

LIVE BETTER ELECTRICALLY

Unit Construction of Allis-Chalmers Regulators makes startling savings possible

A 2-man crew arrives in a pickup truck, switches the regulator off the line and sets up the hydraulic jack. In a matter of a few minutes the entire mechanism is lifted far enough out of the tank for inspection. Even the bushings remain in place.

There's no need for a large crew and expensive equipment to move regulator and service it.

This is just one of many savings using Allis-Chalmers regulators. For the complete story, call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

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